Liebert®

MONITORING

SITESCAN WEB

SOLUTIONS GUIDE

EMERSON™
Network Power

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1.0 SYSTEM OVERVIEW

SiteScan Web uses a network of microprocessor-based control modules to monitor and control Liebert air, power, UPS and other critical equipment.

SiteScan Web enables the user to monitor and control equipment in a single building, an entire campus or a network of facilities around the globe. A SiteScan Web system utilizes a Web-based server running Windows XP, 2003 Server or 2000 and a conventional Web browser to gather information, change operating parameters, run reports and perform similar functions on various types of critical equipment.

A central Web-based server communicates with control modules and generates Web pages, which the customer can access using a conventional Web browser. Through SiteScan Web, the customer can gather information, change operating parameters, run reports and perform other critical monitoring system functions on equipment in a single facility or in dozens of locations.

The Web server and Liebert gateway communicate over an Ethernet network. The Liebert gateway communicates to the Liebert control modules using the Control Module network (CMnet) and the ARCnet156 protocol. The control modules communicate with the Liebert environmental and power equipment using the Information Gathering Network (IGMnet) or to contact closure equipment using a signal cable.

Customers access the information presented as a result of these functions using a Web browser. Internet Explorer is the browser supported by the SSWEB server.

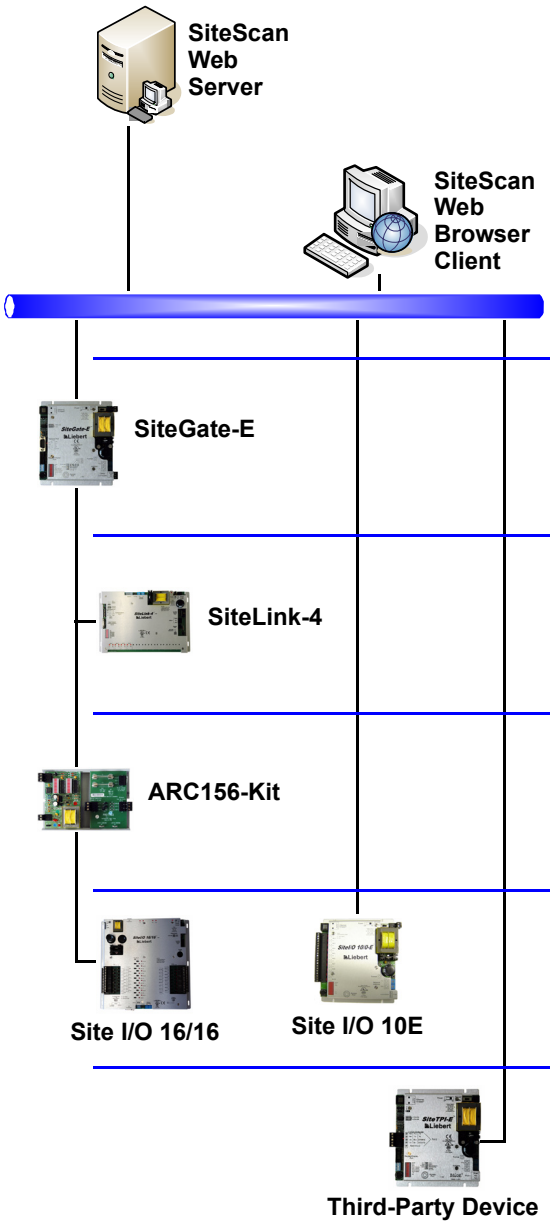
1.1 What's in This Manual

This manual is intended to give you an understanding of how a SiteScan Web system works, what equipment is compatible with a SiteScan Web system, how a system is configured and what constitutes the monitoring portion of the system.

In addition, this manual includes configuration diagrams to show monitoring of Emerson Network Power equipment as well as attachment to third-party equipment and integration with SiteScan Web systems.

1.2 Typical SiteScan Web System

A typical SiteScan Web system may include the components shown in the figure below.



Server Software and Client License

(see 2.1 - Application Software)

- **SiteScan Web Server** - A dedicated computer running SiteScan Web server software, including a database that stores system configuration, custom graphics and equipment interfaces. For hardware and operating requirements, see **Table 1**.
- **SiteScan Web Client** - A workstation on the network that uses a conventional Web browser, such as Internet Explorer, to access the SiteScan Web server. The workstation may also be used for functions not related to SiteScan Web.
- **Ethernet Backbone** - The customer's existing network, including router and wiring or wireless connection gear.

Router Gateway

(see 2.3 - Gateway Modules)

- **Ethernet Gateway** - The gateway that communicates with the SSWEB server, other Ethernet gateways and the control module network.

IGM Interface Control Modules

(see 2.4 - SiteLink Modules)

- **SiteLinks** - Control modules that provide IGM communications between the Liebert environmental and power equipment and the Liebert gateway.

ARCnet Communication Devices

(see 2.8 - ARCnet Communication Enhancement Devices)

- **ARCnet devices** - An ARC156-Kit, which must be installed on every ARC156 network; controls biasing and proper termination of the ARC156 network.

Input/Output Control Modules

(see 2.5 - Site I/O Modules)

- **Site I/O Modules** - A selection of modules that translate analog and digital signals within your critical environments. These modules may provide digital signals for output control.

Third-Party Interfaces

(see 2.9 - Third-Party Interfaces)

- **SiteTPI-E** - A monitoring and control module that enables non-Liebert Modbus devices to be incorporated into the SiteScan Web System; used to interface with third-party equipment such as generators, fire suppression systems or competitive gear.

2.0 PRODUCT DESCRIPTION

2.1 Application Software

SiteScan Web is based on server/thin-client architecture, designed around the open standards of Web technology. The SiteScan Web Server communicates using ASHRAE's BACnet/IP protocol and is accessed using a Web browser over the owner's intranet or external through the Internet. The intent of the thin-client architecture is to provide operators complete access to the system via a standard Web browser. The thin-client Web browser Graphical User Interface (GUI) supports Microsoft® Internet Explorer (version 5.5 or later). The SiteScan Web server software supports Windows 2000 and XP platforms and support for Windows 2003 Server.

2.1.1 SSWEB - SiteScan Web Base Product

The SiteScan Web base product includes:

- Server Software
- Database
- Web Browser Graphical User Interface
- Unlimited Users

Refer to **Table 1** for the minimum computer requirements for SiteScan Web server software.

Table 1 Minimum requirements - SiteScan Web server*

- Windows 2000, Windows XP Professional
- Microsoft Internet Explorer v6.0 or later
- Appropriate driver for your database
- **Single User:** 1GHz Pentium® III processor 1Gb RAM
  Multi User: Dual 1GHz Pentium® III processor 1Gb RAM
- 100Mb hard disk space available for SiteScan Web plus the recommended amount for your graphics software utilities
  NOTE: A SCSI hard disk interface is recommended if the customer will make extensive use of alarms or historical trends.
- CD-ROM drive
- Mouse
- Key keyboard
- SVGA display card and monitor that support a resolution of 1024x768 pixels with true color (32-bit)
- 10/100 Mbps Ethernet network card

* SiteScan Web should have its own dedicated server. Having other Web server applications running on the same machine may cause conflicts.

2.1.2 SSWVUP - Upgrade SiteScan Web to the Latest Version of SiteScan Web

This part covers the charge to upgrade the system to the latest version of SiteScan Web. If the existing SiteScan Web is a legacy upgrade from SiteScan 2000/2W and graphic floor plans were never upgraded, they must be upgraded. See HIGRAPHICUP (**page 4**) and HIGRAPHICUP-5 (**page 4**).

2.1.3 SSWEBUP - Upgrade From SS2000 or SS2W

The SiteScan upgrade version allows a current SS2000 or SS2W system to be upgraded to SiteScan Web. The DC4-i422 and DC12-i422 modules will no longer be supported and must be upgraded to the current SiteLink modules.

See **Table 1** for server and client computer specifications.

NOTE

Ordering the SSWEBUP part upgrades only the customer's SiteScan 2000W application. This does not include upgrading the customer's floor plans and graphics.

For details, see:

- *HIGRAPHICUP (**page 4**)*
- *HIGRAPHICUP-5 (**page 4**)*

2.2 Custom Software Development

Determine the number of graphics necessary for the customer. By default, SiteScan Web includes a generic, top-level graphic, showing the Liebert SiteScan Web logo and the company name as a starting point for the system.

Customized graphics—available in two- and three-dimensional (2D and 3D) versions—may represent buildings, floor plans, one-line schematics or maps to help customers pinpoint monitored equipment.

2.2.1 SITECONFIG-SVC - SiteScan Configuration Service Agreement

The SiteScan Configuration Service Agreement is a service now offered on all SiteScan projects. For a period of one year from the placement of any order, the SiteScan Production Group will provide configuration and customization services on all configuration part numbers.

Additional Benefits

In addition to the initial custom-configured software delivered by the SiteScan Production Group, the following assistance will be provided during the effective period:

- The SiteScan Production Group will implement minor changes and corrections to the proposal before the initial startup at no charge. The changes will be field-installed during the initial startup performed by Liebert Global Services.
- Minor changes required after the initial startup are also included at no charge as part of this agreement. The field installation of these changes may be done by the customer or by Liebert Global Services and may require the purchase of additional installation services.
- Minor changes include adjustments to floor plans, graphics, equipment location, unit names, alarm point names, leak detection graphics, colors, navigation links and the addition of new monitored Liebert units (e.g., UPS, air unit, PDU, I/O points). Development of previously undefined logic or adding completely new floor plans or graphics will require a proposal for a new service agreement.

The following configuration part numbers, when selected with quantities as specified, and the associated price will be automatically accumulated into this new configuration part number.

HIGRAPHIC - Create a Graphic

Order a single customized pictorial software in 2D or 3D that represents a building, floor plan, one-line schematic, map, etc. 2D graphics are recommended due to content and clarity.

HIGRAPHICM - Modify a Graphic

Modify an existing SiteScan Web customized 2D or 3D graphic.

HIGRAPHICUP - Upgrade SS2000W Graphic to SSWeb Java-Based Graphic (1)

Upgrade an existing SiteScan 2000W customized 2D or 3D graphic, which includes re-creating the complete graphic within the SiteScan Web system. This method incorporates the latest tools for creating customized graphics and ensures a consistent Web interface.

HIGRAPHICUP-5 - Upgrade SS2000W Graphics to SSWeb Java-Based Graphics (2-5)

Upgrade up to five existing SiteScan 2000W customized 2D or 3D graphics, which includes re-creating the complete graphics within the SiteScan Web system. This method incorporates the latest tools for creating customized graphics and ensures a consistent Web interface.

TEXTMOD - Customized Modifications

Modify existing configurations or the logic necessary to perform a function that a Liebert unit does not normally perform. Consult applications engineering at 800-222-5877.

NOTE

It is strongly recommended that only 24 points per graphic be included with a 1024x768 2D graphic screen and 12 points per graphic for a 1024x768, 3D graphic screen.

If you do not upgrade the current SiteScan 2000 graphics, the existing graphics will be not be modified. Most SiteScan 2000W graphics were created at a lower resolution.

MODCONFIG-4 - Modbus Configuration

Modbus Interface driver and Modbus Ready function blocks for the SiteLink-4.

MODCONFIG-12 - Modbus Configuration

Modbus Interface driver and Modbus Ready function blocks for the SiteLink-12.

BACCONFIG-4 - BACnet Configuration

BACnet Interface driver and BACnet Ready function blocks for the SiteLink-4.

BACCONFIG-12 - BACnet Configuration

BACnet Interface driver and BACnet Ready function blocks for the SiteLink-12.

2.3 Gateway Modules

In SiteScan Web, Liebert gateways route BACnet over IP traffic between Liebert gateways and the Web server. The gateway receives BACnet over ARCnet from the Liebert control modules and converts it to BACnet over IP for communication to the SSWEB server.

- At least one gateway is required for SiteScan Web to operate.
- Usually one gateway is applied to each facility or location that is being monitored.

NOTE
The maximum numbers of modules per gateway is 50. This includes any combination of SiteLink, Site I/O and SiteTPI modules.

2.3.1 SITEGATE-ETH - Ethernet-Ready Gateway Module in 1U 19-Inch Rack

The SiteGate-ETH is a 1U 19-inch rack mountable 32-bit Ethernet-ready communications gateway that includes two EIA-232 connections (either dial-up or direct connect) and one Ethernet 10baseT port for communications to the SSWEB server and provides an interface to a single Control Module network (CMnet/ARCnet).

The power supply is provided with the SiteGate-ETH.

- The SiteGate-ETH is rack-mounted and includes a power supply. It also has one Ethernet IEEE 802.3 port, RJ-45 connector, 10 Mbps.
- Two serial ports - one EIA-232, DB-9 male and one EIA-232, five-pin screw terminal connector; both are 38.4K/9600 bps selectable.
- One control module network port EIA-485 twisted pair, ARC156K/38.4K/9600 bps selectable, optically isolated.

2.3.2 SITEGATE-E - Ethernet-Ready Gateway Module in Standard SiteScan Wall-Mounted Enclosure

SiteGate-E is a 32-bit communication gateway that includes one Ethernet 10baseT port for communications to the SSWEB server and provides an interface to a single Control Module network (CMnet/ARCnet). The module is assembled in an enclosure.

The SiteGate-E may be wall- or floor-mounted and has:

- One Ethernet IEEE 802.3 port, RJ-45 connector, 10 Mbps.
- One serial port EIA-232, DB-9 male, 38.4K/9600 bps selectable.
- One control module network port EIA-485 Twisted pair, ARC156K/38.4K/9600 bps selectable, optically isolated.

The SiteGate-E requires a separate 24VAC power supply—use P/N XFMR24—for U.S. installations (see **2.7.3 - XFMR24 - 24V Transformer**). Communication cables are user-supplied.

2.4 SiteLink Modules

A SiteLink module receives IGM protocol from Liebert environmental and power equipment and converts it to BACnet over ARCnet for communication to a Liebert gateway.

In this section you will have to determine the type of SiteLink needed to monitor the Liebert equipment. To do this, determine how many Liebert units you have and where are they located.

NOTE

Due to distance requirements of the IGM (EIA-422) cable, the location of the units being monitored may affect the number of SiteLinks needed, more than the number of monitored units themselves.

Consider the layout of the equipment. The Liebert units communicate over a twisted pair of wire that is "home-run" between the unit and the SiteLink module. The distance of this wire should not exceed 1500 ft. (457m). Consult ***7.0 - Wiring Guidelines*** *for wire specifications.*

Each SiteLink features:

- Two serial ports—one EIA-232, DB-9 male, and one EIA-485/232, 2 / 4 wire screw terminal connector—both 38.4K/9600 bps selectable for third-party connections
- One access port for diagnostics and flash installation
- Four or twelve EIA-422, two-wire screw terminal ports for Liebert equipment connections
- One Control Module network port EIA-485 twisted pair, ARC156K/38.4K/9600 bps selectable, optically isolated

NOTE

Each SiteLink unit requires a separate 24VAC power supply; use XFMR24 for U.S. installations (see ***2.7.3 - XFMR24 - 24V Transformer****).*

2.4.1 SITELINK-12 - SiteLink-12 Control Module

The SiteLink-12 control module is an IGM EIA-422 interface module allowing for communication with 12 Liebert unit controllers (IGMs) and communicates to the Liebert gateways over the CMnet (EIA-485). The module is assembled in an enclosure.

2.4.2 SITELINK-4 - SiteLink-4 Control Module

The SiteLink-4 control module is an IGM EIA-422 interface module allowing for communication with four Liebert unit controllers (IGMs) and communicates to the Liebert gateways over the CMnet (EIA-485). The module is assembled in an enclosure.

2.5 Site I/O Modules

A Site I/O module is used to interface to dry contacts or sensors, the types of connections required to monitor generators, fire systems, doors, temperature, humidity and pressure.

Site I/O modules provide monitoring for contact closures and analog sensors:

- Dry contacts
- Thermistors
- 4-20mA transducers
- 0-5VDC transducers

NOTE
*Each Site I/O unit requires a separate 24VAC power supply; use XFMR24 for U.S. installations (see **2.7.3 - XFMR24 - 24V Transformer**).*

2.5.1 SITEIO10 - Site I/O 10/0 Module

The Site I/O 10/0 module is a universal input module capable of monitoring up to 10 inputs, analog, thermistor and dry contact. The analog inputs may be 4-20mA, 0-5VDC or thermistor inputs. The module is assembled in an enclosure. Sensor cables are user-supplied. Site I/O X8/0 can be used to expand the number of points. However, the Site I/O 10/0 enclosure is not designed to house any expanders.

2.5.2 SITEIO10E - Site I/O 10E Module

The Site I/O 10E module is an input module capable of monitoring up to 10 inputs, analog, thermistor and dry contact. The analog inputs may be 4-20mA, 0-5VDC or thermistor inputs. The module is assembled in an enclosure. Sensor cables are user-supplied.

NOTE
A resistor must be used to input the 4-20mA input signal. An external power supply is required for analog inputs.

2.5.3 SITEIOX80 - Site I/O X8/0 Module

The Site I/O X8/0 module is a universal input module expander board to be used with the Site I/O modules (Site I/O 10/0WO, Site I/O 16/16WO or Site I/O 32/0WO). Each Site I/O X8/0 module will add eight universal points to a Site I/O module. This module must be used with a Site I/O module only and does not come with an enclosure or power supply. A maximum of five Site I/O X8/0 modules (40 additional universal points) may be added to one Site I/O module.

2.5.4 SITEIO320 - Site I/O 32/0 Module

The Site I/O 32/0 module is a universal input module capable of monitoring 32 inputs—analog, thermistor and dry contact—and interfaces directly with the CMnet. The analog inputs may be 4-20mA, 0-5 VDC or thermistor inputs. The module is assembled in an enclosure. Communication cables are user-supplied. Site I/O X8/0 can be used to expand the number of points. However, the enclosure is not designed to house any expanders.

2.5.5 SITEIO1616 - Site I/O 16/16 Module

The Site I/O 16/16 module is a universal input/output module. The unit has 16 analog or dry contact inputs and 16 digital outputs and interfaces directly with the CMnet. Analog devices can be 4-20mA, 0-5VAC or thermistor input. The module is assembled in an enclosure. Communication cables are user-supplied. Site I/O X8/0 can be used to expand the number of points. However, the enclosure is not designed to house any expanders.

NOTE
Contact Applications Support at 1-800-222-5877 for pricing on custom programming for inputs and outputs.

2.6 Stand-Alone Monitoring Modules

The Liebert stand-alone monitoring modules include the RPMP, Universal Monitor and Liqui-tect Monitoring System. The following remote monitoring modules communicate with a SiteLink using the IGM protocol, the RS-422 media access type and a two-screw terminal connection type.

2.6.1 RPMP

The RPMP Remote Power Monitoring Panel monitors:

- INPUT: Voltage (line-to-line, three phases)
- OUTPUT: Voltage (line-to-line and line-to-neutral, three phases) and current (three phases, ground, neutral)
- Frequency
- % Load per phase kVA
- kW

Alarms include Output Overvoltage and Undervoltage, Transformer Overtemp, Output Overcurrent, Frequency Deviation, Phase Loss and Ground Overcurrent.

The RPMP also has an LCD on the front panel that provides local monitoring. Refer to **2.7 - Module Accessories** for current transformer selections. Current transformers and fused voltage sense leads are field-supplied/required. (Ground 50:5 CT is factory-supplied with the RPMP.)

2.6.2 UMS02400, UML11500, UML23000 - Universal Monitor

The Universal Monitor is a self-contained unit capable of monitoring any device that closes an electrical contact or has a 4-20mA signal. It offers remote access through SiteScan Web.

The enclosure of the Universal Monitor makes it suited for various applications in both new construction and retrofit jobs. The Universal Monitor can be mounted on a wall's surface or recessed within a wall.

2.6.3 UMEXP - I/O Expansion Module for Universal Monitor

The UMEXP is an I/O expansion module that provides an additional 16 digital inputs and eight digital outputs. When connected, this module increases the Universal Monitor's capacity to a total of 24 digital inputs and 16 digital outputs.

2.6.4 LPS0240, LPL1150, LPL2300 - Liqui-tect Monitoring System

The Liebert Liqui-tect Monitoring System is a leak detection unit designed for computer rooms and other large areas. The system provides direct-read at the control unit location, as well as the ability to communicate with SiteScan Web.

The panel can monitor up to 10,000 ft. (3048m) of Liebert LT500Y leak detection cable, divided into two zones of up to 5,000 ft. (1524m) each.

2.7 Module Accessories

2.7.1 GXEXP - Expander Cable

The Site I/O Expander Cable is an 18-inch long or 24-inch long expander cable used between the Site I/O X8/0 modules. Because expander modules plug directly into the side of the adjoining module, the grouping tends to become very long in the horizontal direction. Use only one (1) GXEXP cable to break up this horizontal length.

2.7.2 RCM10PSKIT - Power Supply Kit

The 24VDC power supply kit to be used with the Site I/O modules and four-wire analog transducers must be mounted outside the Site I/O module. This power supply is needed only when four-wire transducers are used. This power supply will accommodate a Site I/O 32/0 fully loaded with 4-20mA transducers.

2.7.3 XFMR24 - 24V Transformer

Each SiteLink, Site I/O and SiteTPI module requires a 24-volt transformer. This model requires a primary of 120VAC, 50-60Hz wall plug (American Duplex) to 24VAC @ 40VA secondary. The secondary has screw terminal connections.

2.7.4 ENCLOSURE - Standard Site Metal Enclosure

An empty site enclosure can be used to house the Site I/O X8 module.

2.7.5 TM115 - 115VAC Transformer Module

The TM115 transformer module converts 115VAC to two 24VAC outputs. The unit includes an On/Off switch, a 115VAC power receptacle and 2 x 24VAC ports @ 40VA.

2.7.6 TM230 - 230VAC Transformer Module

The TM230 transformer module converts 230VAC to two 24VAC outputs. The unit includes an On/Off switch and 2 x 24VAC ports @ 40VA.

2.8 ARCnet Communication Enhancement Devices

In SiteScan Web systems, **ARCnet**, or ARC156, is the standard for module-to-module communications. Formerly, this was termed *CMnet* in SiteScan 2000/2W systems. The main difference is the control module network now operates at a faster baud rate (156K baud with ARCnet vs. 9600 or 38.4K baud with CMnet). The increase in speed requires a low impedance / low capacitance wiring. Also, all control modules must be wired in a daisy-chain configuration.

ARCnet enhancement devices can be used to control and maintain the proper biasing of the ARCnet network.

2.8.1 ARC156-KIT - ARCnet Kit

The ARC156-Kit contains a PROT485 surge protection board and a DIAG485 diagnostic board within the same site enclosure. This kit must be installed near the midpoint of each ARCnet segment. Requires 24VAC supply (not included).

2.8.2 Other ARCnet Parts

ARCDIAG485 - ARCnet156 Diagnostics Board

The ARCnet156 diagnostics board in an enclosure provides visual indication of signal levels and adds bias to reduce the effect of noise on a segment. More than one DIAG485 can be installed on a specific ARCnet segment.

NOTE
Only one DIAG485 within an ARCnet segment should have its bias jumper in place.

ARCDIAG485WO - ARCnet156 Diagnostics Board Without Enclosure

The ARCnet156 Diagnostics Board is available without an enclosure. Requires 24VAC supply (not included).

NOTE
Install one 120 ohm terminating resistor at the beginning and end of each segment unless the segment is less than 10 ft. (3m) long (included with ARCDIAG485).

ARCPROT485 - ARCnet156 Surge Protection Board

The ARCPROT485 is an ARCnet device used for surge suppression. It is recommended that this device be installed at every entrance and exit of a building.

ARCPROT485WO - ARCnet156 Surge Protection Board Without Enclosure

The ARCnet156 surge suppressor device is available without enclosure.

ARCREP485 - ARCnet156 Repeater Board (Signal Booster)

The ARCnet156 Repeater boosts the ARCnet156 network signals and extends the length of the network by joining one segment to another for EIA-485 networks running from 1200 bps to 156 Kbps. Requires 24VAC supply (not included).

When designing your system, factor in the maximum wiring distance of 2,000 ft. (610m) per segment. (A segment is up to 32 modules.) If your system requires more than 32 modules per segment or exceeds the distance of 2,000 ft. (610m), install another gateway or, possibly, use an ARCREP485. The signal becomes weaker as distance increases.

ARCREP485WO - ARCnet156 Repeater Board Without Enclosure

The ARCnet156 signal booster (repeater) is available without enclosure.

2.9 Third-Party Interfaces

The SiteTPI-E is designed to communicate with third-party equipment that uses Modbus or BACnet. Use a SiteTPI to interface with third-party equipment such as generators, fire suppression systems or competitive gear.

NOTE

*Each SiteTPI-E unit requires a separate 24VAC power supply; use XFMR24 for U.S. installations (see **2.7.3 - XFMR24 - 24V Transformer**).*

2.9.1 SITETPI-E - Ethernet-Ready Third-Party Interface Module

The SiteTPI-E is a monitoring and control module that enables non-Liebert Modbus or BACnet devices to be incorporated into the SiteScan Web System. It accepts the open protocol through the EIA-232 or EIA-485 port and can accommodate a total of 2,000 data points. Because each non-Liebert device is unique, it is necessary to contact Applications Support at 1-800-222-5877 for the development of this interface. The module is assembled in an enclosure.

Each SiteTPI-E features:

- One Ethernet-ready RJ-45 port
- Two serial ports—one EIA-232, DB-9 male and one EIA-485/232, 2- or 4-wire screw terminal connector—both 38.4K/9600 bps selectable for third-party connections

NOTE

A SiteTPI-E module cannot support both 2-wire and 4-wire Modbus devices at the same time—only one type may be used on a single SiteTPI-E module.

- One Control Module network port EIA-485 twisted pair, ARC156K/38.4K/9600 bps selectable, optically isolated

NOTE

*SiteTPI-E does not include any custom programming. See **2.9.2 - TPICONFIG - Interface For Up to 3 Modbus Devices**.*

2.9.2 TPICONFIG - Interface For Up to 3 Modbus Devices

An interface for up to 3 Modbus devices supports up to 100 Modbus display points and 3 standard graphic bezels.

NOTE

At least one TPICONFIG must be ordered with each SiteTPI-E.

For guidance in applying third-party interfaces, contact Applications Support at 1-800-222-5877.

2.9.3 REPOPT - Communication Amplifier and EIA-232 to EIA-485 Converter

The REPOPT is a communication device which provides two bi-directional ports that are optically isolated. It can be used to amplify communication signals that may degrade over lengthy runs or as an EIA-485 signal to EIA-232 signal converter.

3.0 APPLICATION AND CONFIGURATION

3.1 Single-Site - SiteScan Web System Not on Customer's Ethernet

3.1.1 Target Application

In a typical application, a customer wants to monitor just a few Liebert units from a single computer, but does not want to put the SiteScan Web System on the company's Ethernet backbone. The main features are:

- Single-site system
- Graphical or non-graphical software
- Small number of Liebert units
- Few or no site-specific monitored points

3.1.2 Description

Install the SiteScan Web software as an application server. This means the server and client connections are running on the same machine. Complete the system with a basic Ethernet hub as a replacement for the local Ethernet to connect the SiteScan Web Server and the SiteGate-E.

3.1.3 Sample Bill of Materials

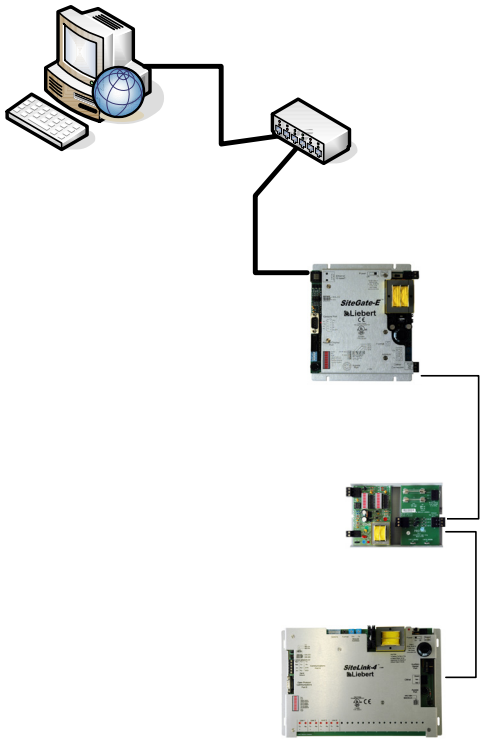
This bill of materials includes only those products shown in the diagram. Other modules can be added to this system as indicated in the diagram.

Table 2 Bill of materials: Single-site - SiteScan Web system not on customer's Ethernet

Qty.	Mktg. P/N	Description
1	SSWEB	SiteScan Web Software
1	SITEGATE-E	32-bit Ethernet-ready gateway module
1	SITELINK-12	SiteScan interface module to 12 Liebert units
1	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 1 Single-site - SiteScan Web system not on customer's Ethernet



3.2 Multiple Data Centers in the Same Building

3.2.1 Target Application

In a typical application, a customer wants to monitor two data centers in the same building but on two different floors. The building does not easily accommodate wiring between floors. The main features are:

- Multiple data centers in the same building
- Liebert units in all data centers
- Intranet that connects the customer's total enterprise

3.2.2 Description

Install the SiteScan Web server in the main data center with a SiteGate-E connected to multiple ARCnet modules. In the second data center, install another SiteGate-E connected to a second set of ARCnet modules. This configuration allows the customer to bypass the need to hire a contractor to pull ARCnet cabling between the different floors.

3.2.3 Sample Bill of Materials

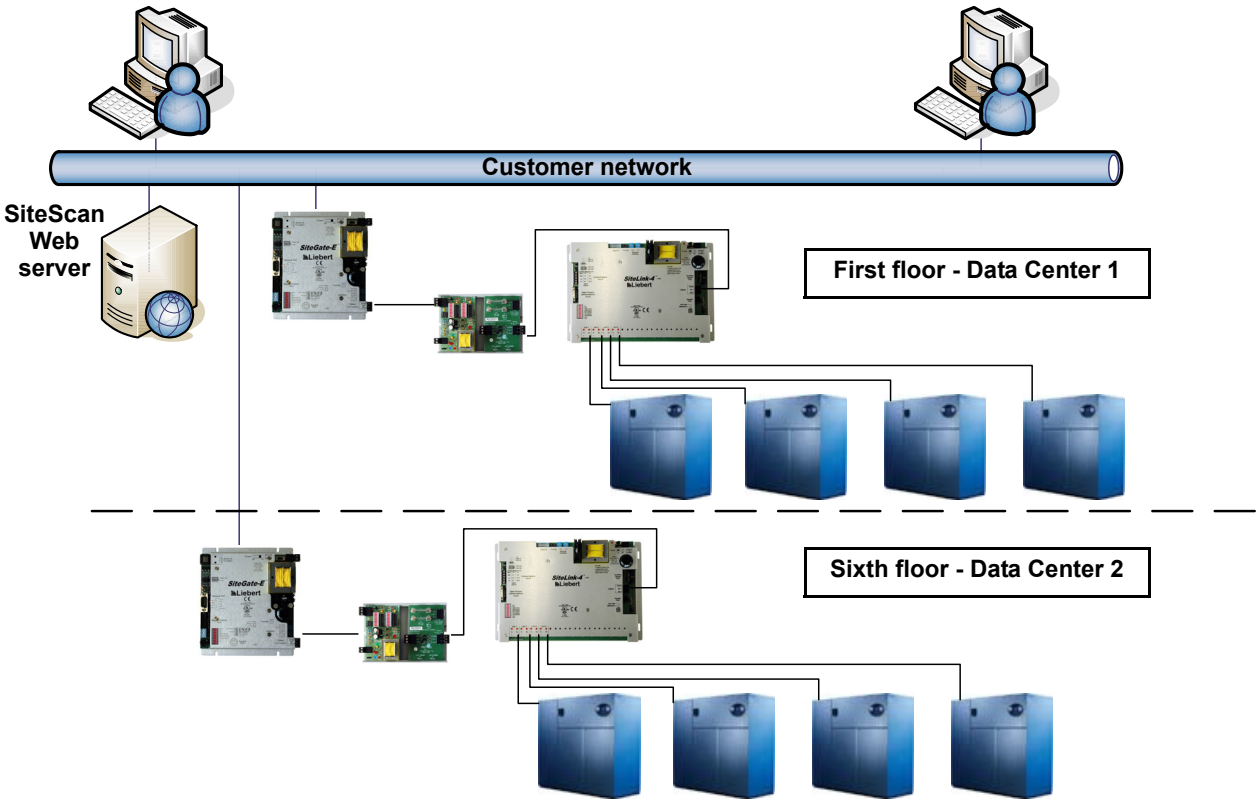
This bill of materials includes only those products shown in **Figure 2**. Other modules can be added to this system as indicated in the diagram.

Table 3 Bill of materials: Multiple sites using intranet

Qty.	Mktg. P/N	Description
1	SSWEB	SiteScan Web Software
2	SITEGATE-E	32-bit Ethernet-ready gateway module
2	SITELINK-12	SiteScan interface module to 12 Liebert units
2	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 2 Multiple data centers in the same building



3.3 Multiple Sites Using Customer's Intranet

3.3.1 Target Application

In a typical application, a customer has multiple data centers in different parts of the world and wants to monitor three facilities from one centralized system. The main features are:

- Users should be able to access their own facility to manage their own equipment. Each data center should have a floor plan with the equipment layout. Main login takes customer to a map of the globe that illustrates the customer's operations.
- Data centers in New York, Tokyo and Mexico City
- Intranet (internal network)
- Centralized management of system
- Each location manages its own equipment

3.3.2 Description

Install the SiteScan Web server on a dedicated server running in the main data center—New York in this example. This server will manage three SiteGate-E modules, which are located in three data centers—New York, Tokyo and Mexico City. The gateway modules may be configured to send event alarms to the SiteScan Web server in the main data center (New York).

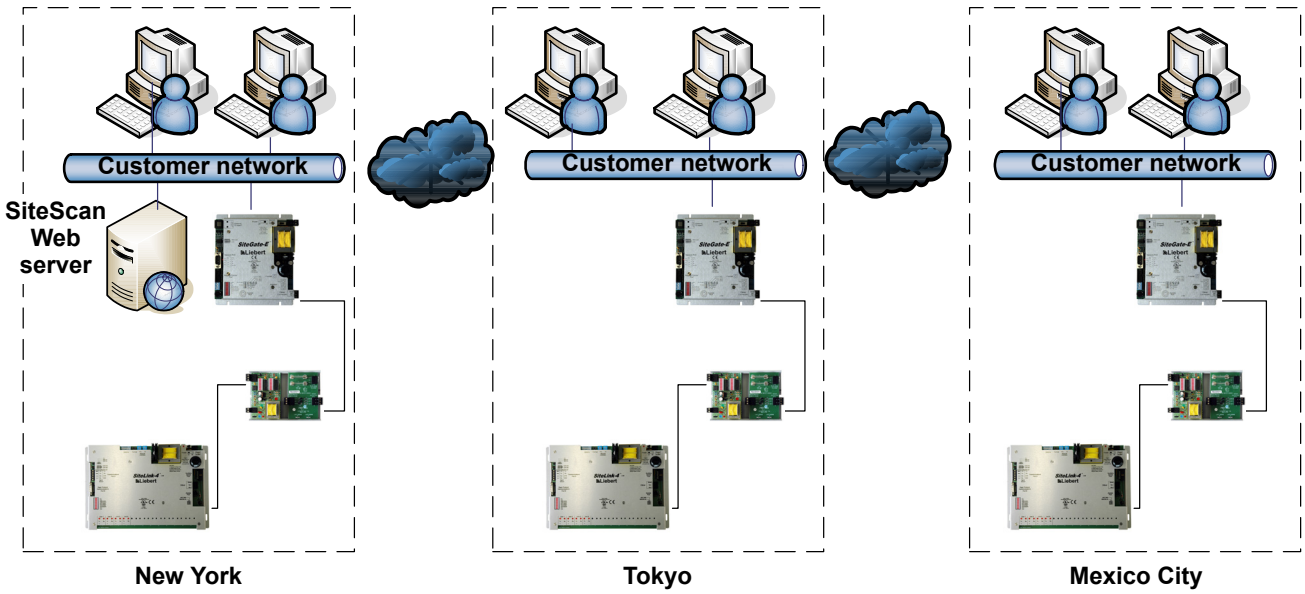
3.3.3 Bill of Materials

Table 4 Bill of materials: Multiple sites using customer's intranet

Qty.	Mktg. P/N	Description
1	SSWEB	SiteScan Web Software
3	SITEGATE-E	32-bit Ethernet-ready gateway module
3	SITELINK-12	SiteScan interface module to 12 Liebert units
4	HIGRAPHIC	Customized graphic as defined by customer
3	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 3 Multiple sites using customer's intranet



3.4 Hierarchical Servers - SiteScan Web with WebCTRL

3.4.1 Target Application

In a typical application, a customer has a WebCTRL BMS system that controls the overall functions of the facility, but now wants to monitor the data center and send notifications of event alarms to the BMS. The main features are:

- Customer has a WebCTRL BMS system.
- Data center needs to be monitored specifically.
- BMS should receive specific alarms from the monitoring system.

NOTE

WebCTRL is the product name of Automated Logic Corporation's building management software. SiteScan Web is the OEM version of ALC's WebCTRL product.

3.4.2 Description

Install a SiteScan Web server in the data center with SiteGate-E and SiteLink modules to allow the customer to monitor critical facility equipment. Set up the WebCTRL system as a hierarchical server that receives notification of specific alarms from the SiteScan Web system.

This allows the BMS software and the monitoring system to run within their own environment. When changes are needed in the monitoring system, the SiteScan Web system is reconfigured and the changes are automatically updated to the WebCTRL system.

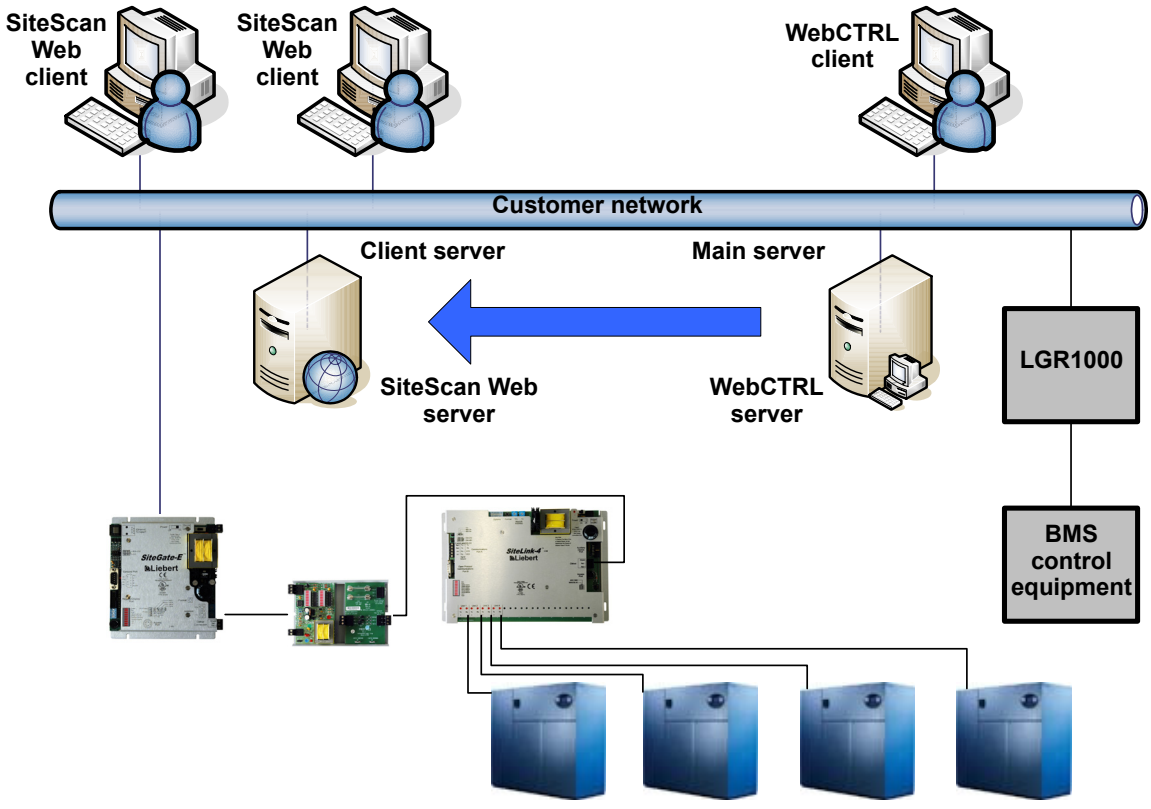
3.4.3 Bill of Materials

Table 5 Bill of materials: Hierarchal servers - SiteScan Web with WebCTRL

Qty.	Mktg. P/N	Description
1	SSWEB	SiteScan Web Software
1	SITEGATE-E	32-bit Ethernet-ready gateway module
1	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure
1	SITELINK-12	SiteScan interface module to 12 Liebert units.

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 4 Hierarchal servers - SiteScan Web with WebCTRL



3.5 Redundant SiteScan Web Servers

3.5.1 Target Application

In a typical application, a customer wants to monitor two facilities using two servers that manage both locations, providing server redundancy. If a server goes off-line, the other still collects alarms from both locations. The main features are:

- Data centers are in two separate buildings.
- Customer wants to have both sites managed by redundant servers.
- If one server goes down, the customer must have access to both sites.
- Each location manages both sites.

3.5.2 Description

Install two copies of the SiteScan Web server software, one in each location. Only one set of customized data files is created and is then loaded at both sites. Set up the servers to manage each site.

Both SiteGate-E modules will send alarm information to both servers. The customer will be able to navigate and monitor both locations' event alarms. Since the gateway modules can send trend information to only one server, the system has been configured for each gateway to send trend data to its local server.

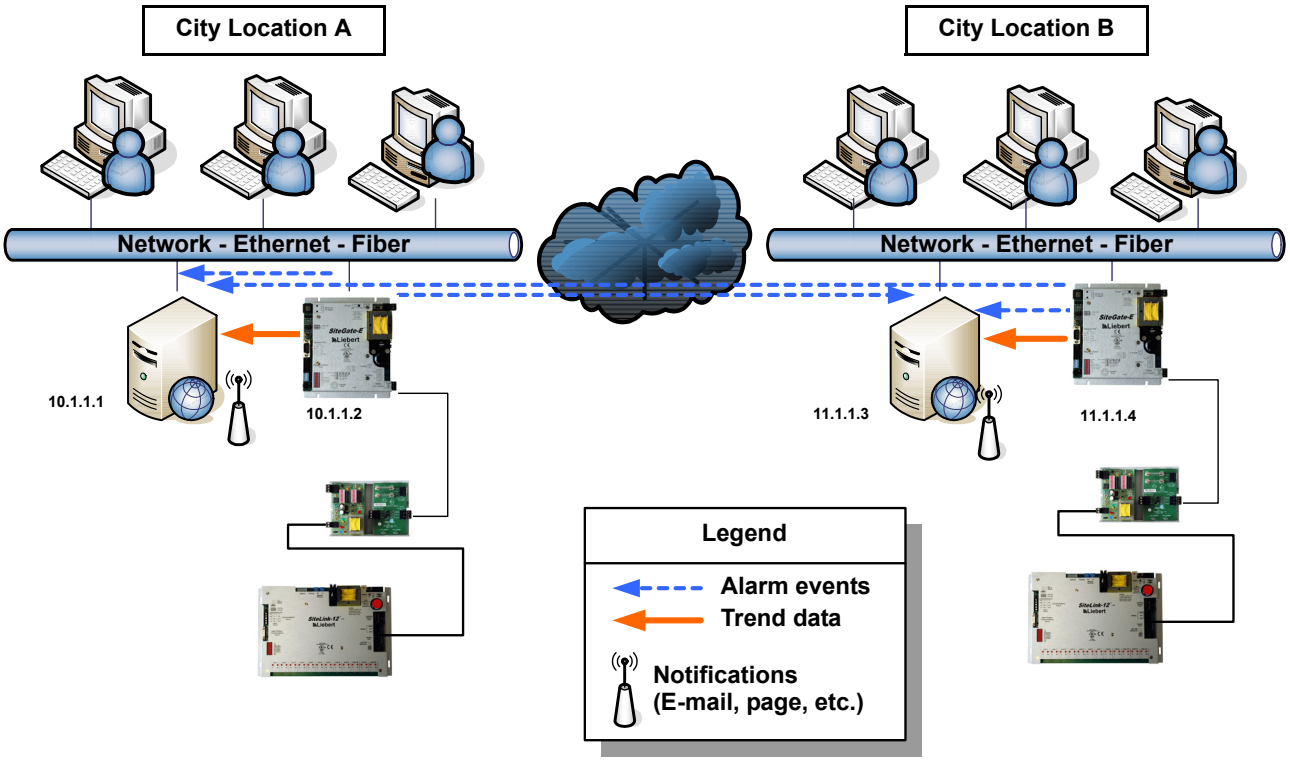
3.5.3 Bill of Materials

Table 6 Bill of materials: Redundant SiteScan Web servers

Qty.	Mktg. P/N	Description
2	SSWEB	SiteScan Web Software
2	SITEGATE-E	32-bit Ethernet-ready gateway module
2	SITELINK-12	SiteScan interface module to 12 Liebert units
2	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 5 Redundant SiteScan Web servers



3.6 SiteScan Web and Rack Monitoring

3.6.1 Target Application

In a typical application, a customer has a data center that contains multiple racks and wants to manage "hot spots" within the racks. Event alarms should be reported on High Temperature. The main features are:

- Data center has Liebert Foundation racks.
- Heat load within the racks needs to be monitored and managed.

3.6.2 Description

Configure the SiteScan Web system with a SiteIO10-E module that has temperature sensors inside the Foundation units. The customer now gets alarm notifications when temperature readings within the racks exceed the defined thresholds.

This allows the customer to move servers and hubs around between the racks to manage and control the heat loads.

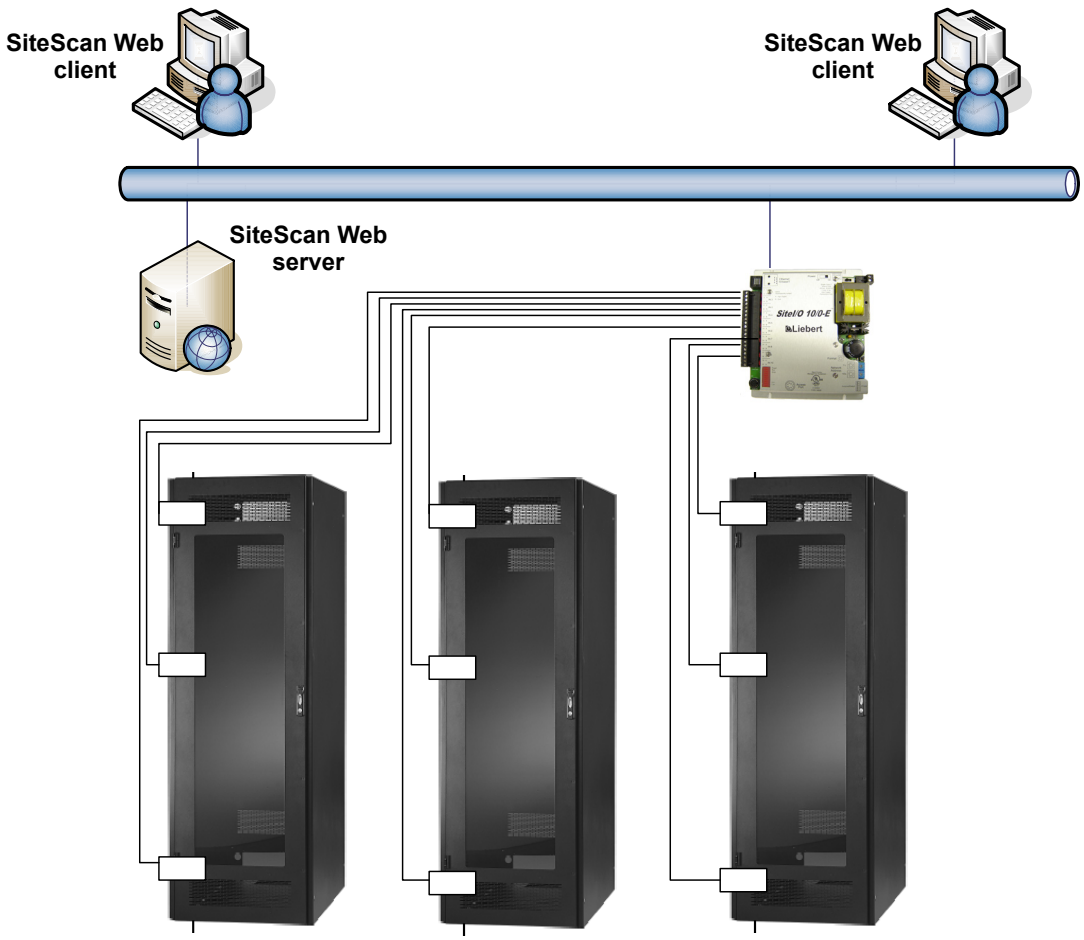
3.6.3 Bill of Materials

Table 7 Bill of materials: SiteScan Web and rack monitoring

Qty.	Mktg. P/N	Description
1	SSWEB	SiteScan Web Software
1	SITEIO10-E	32-bit Ethernet-ready gateway module

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 6 SiteScan Web and rack monitoring



4.0 UPGRADING SITESCAN 2000 SYSTEMS TO SITESCAN WEB

A SiteScan Web upgrade allows an existing SS2000 or SS2W system to communicate with SiteScan Web. Since SiteScan Web requires an Ethernet-ready gateway module, the SiteGate-232 or DCLan must be replaced during the upgrade.

Since the SiteScan Web upgrade requires a platform change from a Windows 16-bit application to a 32-bit Java application, some features may not be available. See **Table 8** for details.

Table 8 Comparison of SiteScan Web and SS2000W Alert features

Feature	SiteScan Web	SiteScan 2000 w/ Alert
SYSTEM FEATURES		
Version	3.x	2.6 w/ 3.0
Operating Systems	Windows NT 4.0 w/SP6 or higher, Windows 2000, Windows XP, Windows 2003 Server	Windows 95, Windows 98, Windows ME
Internationalization	English, Spanish, French, Dutch, German, Simplified Chinese, Traditional Chinese, Korean	—
Database	MS Access, SQL Server & Oracle	—
Server-Based	Internet Explorer	Client Software Required
Help	HTML-Based	Windows Help
SECURITY FEATURES		
User Privileges & Accounts	✔	—
Run as Service	✔	—
Automatic Logout	✔	✔
Operator Audit Logging	✔	✔
SSL (Secured Socket Layer)	✔	—
GRAPHICS FEATURES		
3D Floor plans	✔	✔
2D Floor plans	✔	✔
Trending	✔	✔
Trend Historian	✔	✔
ALARM MANAGEMENT FEATURES		
Alarm Filtering	✔	✔
Multiple Alarm Management	✔	✔
Comments to Alarm	✔	✔
Change Colors of Alarms	—	✔
REPORTING ACTION FEATURES		
Alarm Escalation	—	✔
ASCII File Write	✔	✔
Numeric Paging	—	✔
Alphanumeric Paging	SMTP	Modem Dial-Out (TAP Only)
Parallel Print	✔	✔
Serial Output	✔	✔
Play Sound Wave	✔	✔
Run External Command	✔	✔
Facsimile	—	✔
E-mail	✔	w/ SiteTrap
LGS Remote Monitoring	w/ Liebert RM Agent	✔
SNMP	w/ Liebert RM Agent	w/ SiteTrap
Format the Output	✔	✔
LOCAL NOTIFICATION FEATURES		
Applications to Foreground	—	✔
Flash Application Icon	—	✔
Play Default Beep	✔	✔

4.1 Upgrade Overview

SiteScan Web Upgrade comes with all the same basic functionality as SiteScan Web.

SS2000 or 2W serial numbers must be retired for a customer to qualify for upgrade pricing.

Where to Find Serial Numbers

The 10-digit software serial numbers can be found:

- On the original installation disks
- On the startup splash screen (log-in) of the software
- By choosing Help, then About from the drop-down menu within the software

Possible Additional Charges

Additional charges that may apply include:

- Each current SS2000 graphic will require a HIGRAPHICUP to upgrade the existing graphic for use in SiteScan Web.
- The gateway module must be a SiteGate-E or SiteGate-ETH. The system will not operate with a SiteGate-232.
- The DC12-i422 and DC4-i422 modules must be replaced with SiteLink modules.

What We Need From You or the Customer:

- A valid SS2000 / SS2W license is necessary for the upgrade. Software serial numbers must be submitted and retired before the upgrade software will be shipped.
- A backup of the current SS2000 configuration files. Your local LGS Site Specialist may have a current copy. Consult LGS as necessary.

Compatibility: CMnet vs. ARCnet

When a customer upgrades a SiteScan 2000W or 2W system, only the legacy SiteScan application is upgraded.

Replacing a SiteGate-232 or DCLan with a SiteGate-E enables the SiteScan Web server to communicate with the modules on the CMnet. Essentially, it is a SiteScan Web front-end communicating with SiteScan 2000W/2W hardware.

To upgrade the CMnet to ARCnet, all modules must be ARCnet-compatible. In most cases this will require replacement of some modules. Also, the CMnet wire must be replaced with the Magnum cable (A3-ARC-156-2). Currently the following devices are not ARCnet-compatible:

- DC12-i422
- SiteLink (Core C)
- SiteTPI-M
- DCU
- SiteGate-232
- DCLan
- DC4-i422
- RCM10U
- OCM8
- DC1
- UCM10-8
- DCH-8

4.2 Upgrading SS2W

A SiteScan Web upgrade of an existing SiteScan 2W system requires replacing each DCLan or SiteGate-232 module with a SiteGate-E module.

4.2.1 Target Application

A typical application for this upgrade might be:

- Customer wants to upgrade a SiteScan 2W system.
- Existing system uses a SiteGate-232 module.

4.2.2 Description

To upgrade a SS2W system that currently uses a SiteGate-232, replace the SiteGate-232 with a SiteGate-E. Since the SS2W system does not support graphics, there is no need to order any upgrade graphic parts. Simply upgrade the customer's system to a SiteScan Web version of the SS2W system. The system will be built as a text-only version of SiteScan Web.

NOTE

*Customers may have to replace the computer running SS2W if it does not meet the minimum operating requirements for SiteScan Web (see **Table 1** in **2.1.1 - SSWEB - SiteScan Web Base Product**). In addition, that computer must be connected to an Ethernet network.*

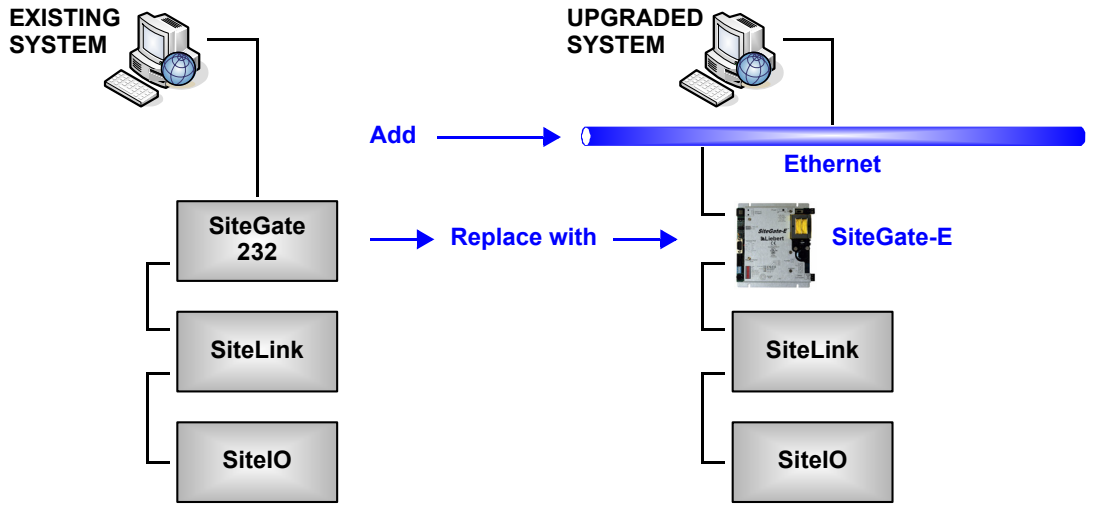
4.2.3 Bill of Materials

Table 9 Bill of materials: Upgrade from SS2W

Qty.	Mktg. P/N	Description
1	SSWEBUP	SiteScan Web upgrade of SS2000W or SS2W
1	SITEGATE-E	32-bit Ethernet-ready gateway module
1	XFMR24	Transformers for 120/24VAC module power supply

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 7 Upgrading from SiteScan 2W



4.3 Upgrading SS2000W While Maintaining Existing Wiring

A SiteScan Web upgrade of an existing SiteScan 2000W system requires replacing each DCLan or SiteGate-232 module with a SiteGate-E module. All graphics must be upgraded.

4.3.1 Target Application

A typical application for this upgrade might be:

- Customer wants to upgrade a SiteScan 2000W system.
- Existing system uses a DCLan.
- System has five graphics.
- CMnet has two DC12-i422 modules and three SiteLink-12 modules.

4.3.2 Description

To upgrade a SS2000W system that currently uses a DCLan, replace the DCLan with a SiteGate-E. Next, you must upgrade the customer's current graphics by ordering one (1) HIGRAPHICUP-5. Lastly, both DC12-i422 modules must be replaced with SiteLink modules.

NOTE
*Customers may have to replace the computer running SS2000W if it does not meet the minimum operating requirements for SiteScan Web (see **Table 1** in **2.1.1 - SSWEB - SiteScan Web Base Product**). In addition, that computer must be connected to an Ethernet network.*

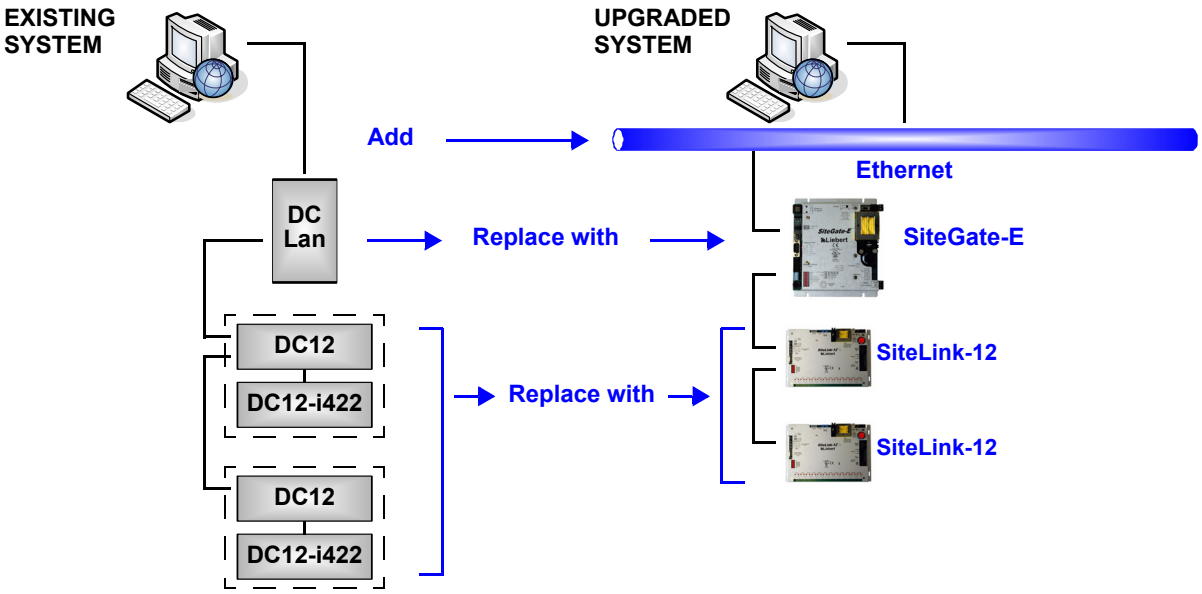
4.3.3 Bill of Materials

Table 10 Bill of materials: Upgrade from SS2000W

Qty.	Mktg. P/N	Description
1	SSWEBUP	SiteScan Web upgrade of SS2000W or SS2W
1	SITEGATE-E	32-bit Ethernet-ready gateway module
1	XFMR24	Transformers for 120/24VAC module power supply
1	HIGRAPHICUP-5	Upgrades up to five (5) SS2000W graphics
2	SITELINK-12	SiteScan interface module to 12 Liebert units

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 8 Upgrading from SiteScan SS2000W while maintaining existing wiring



4.4 Upgrading SS2000W to Full SiteScan Web

A full SiteScan Web upgrade of an existing SiteScan 2000W system permits the customer to take full advantage of the SiteScan Web system.

This upgrade requires replacing each DCLan or SiteGate-232 module with a SiteGate-E module. All graphics must be upgraded.

4.4.1 Target Application

A typical application for this upgrade might be:

- Customer wants to upgrade a SiteScan 2000W system.
- Existing system uses a SiteGate-232.
- System has four existing floor plans.
- CMnet has two DC12-i422 modules, one RCM10U I/O modules and two SiteLink-12 modules.

4.4.2 Description

To upgrade a SS2000W system to a full SiteScan Web System, all hardware, including the gateway module, must be ARCnet-compatible. All modules that are not ARCnet-compatible must be replaced. Next, the CMnet wire must be replaced with a Magnum cable (A3-ARC-156-2). Also, you must order upgrades to convert the customer's current graphics to SiteScan Web Java-based graphics.

Be sure to make a note on the Site Survey that the job should be built as a full SiteScan Web system.

NOTE

*Customers may have to replace the computer running SS2000W if it does not meet the minimum operating requirements for SiteScan Web (see **Table 1** in **2.1.1 - SSWEB - SiteScan Web Base Product**). In addition, that computer must be connected to an Ethernet network.*

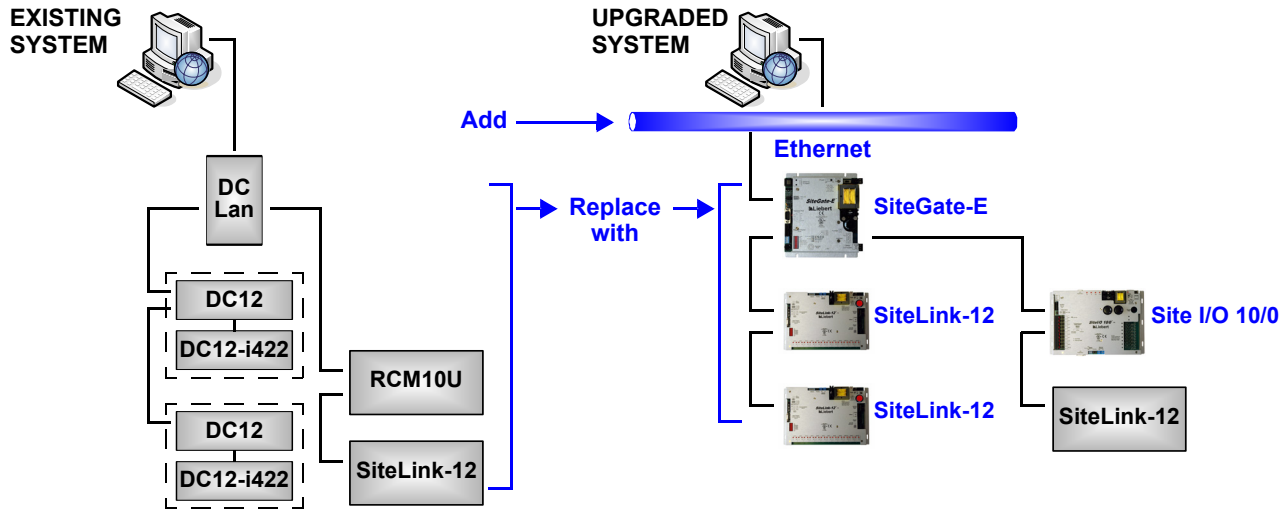
4.4.3 Bill of Materials

Table 11 Bill of materials: Full SiteScan Web upgrade from SS2000W

Qty.	Mktg. P/N	Description
1	SSWEBUP	SiteScan Web upgrade of SS2000W or SS2W
1	SITEGATE-E	32-bit Ethernet-ready gateway module
4	XFMR24	Transformers for 120/24VAC module power supply
1	HIGRAPHICUP-5	Upgrades up to five (5) SS2000W graphics
1	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure
1	SITEIO10	Site I/O 10/0, Universal Input Module - 10 points
2	SITELINK-12	SiteScan interface module to 12 Liebert units

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.
Note: The bill of materials does not include the cost of replacing the CMnet wire to ARCnet wire.

Figure 9 Upgrading from SS2000W to full SiteScan Web



5.0 THIRD-PARTY AND BUILDING MANAGEMENT INTERFACES

SiteScan Web monitoring products can provide multiple paths for integrating to and with third-party equipment and software. Through BACnet over IP, SiteScan Web software allows you to interface with more than one building management system (BMS) at a time. The SiteLink hardware is designed to communicate concurrently with SiteScan Web and a BMS using Modbus over EIA-232 or EIA-485.

5.1 SiteScan Web and BACnet/IP to BMS

5.1.1 Target Application

A typical application might be:

- Customer has a BMS front-end that is used by the facility manager.
- Two new computer rooms need to be monitored by BMS and IT Manager.
- Each computer room will have:
  - 3 Liebert environmental units
  - 1 STS2/PDU
  - 2 NPower UPSs
  - 4 analog sensors
  - 2 strobe lights for alarm conditions
- One local user is allowed.

5.1.2 Description

This configuration is ideal for customers who have a current investment within their BMS and require the IT Manager's access to their business unit. SiteScan Web server natively communicates BACnet/IP to its Ethernet-ready gateway modules. This same protocol is available to any BMS front-end that supports BACnet/IP.

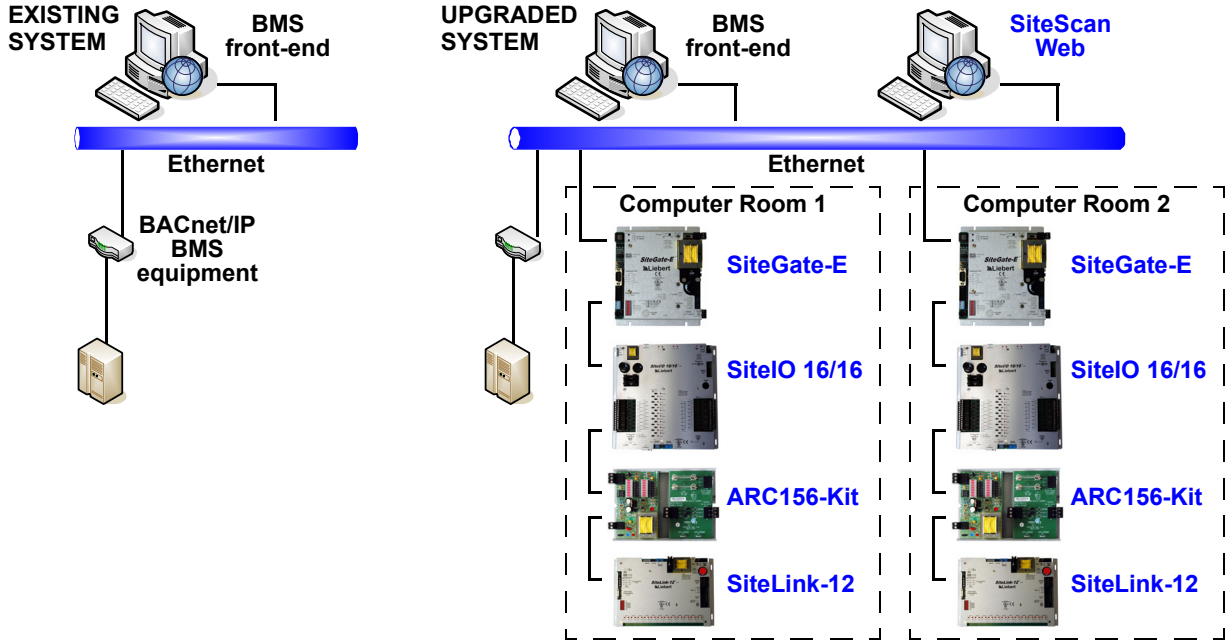
5.1.3 Bill of Materials

Table 12 Bill of materials: SiteScan Web and BACnet/IP to BMS

Qty.	Mktg. P/N	Description
1	SSWEB	SiteScan Web Server Software, includes 2 concurrent users
2	SITEGATE-E	32-bit Ethernet-ready gateway module
8	XFMR24	Transformers for 120/24VAC module power supply
2	SITELINK-12	SiteScan interface module to 12 Liebert units
2	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure
2	SITEIO1616	Site I/O module, 16 universal inputs and 16 digital outputs

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 10 SiteScan Web and BACnet/IP to BMS



5.2 BACnet/IP to BMS Without a SiteScan Web Front-End

5.2.1 Target Application

A typical application might be:

- Customer has a BMS front-end and does not want a SiteScan Web front-end.
- Two new computer rooms need to be monitored by BMS.
- Each computer room will have the following:
  - 3 Liebert environmental units
  - 1 STS2/PDU
  - 2 NPower UPSs
  - 4 analog sensors
  - 2 strobe lights for alarm conditions
- One local user is allowed.

5.2.2 Description

This configuration is ideal for customers who have a current investment within their BMS and do not want another front-end for monitoring. The SiteGate-E gateway module natively communicates BACnet/IP to the SiteScan Web front-end. This same protocol is available to any BMS front-end that supports BACnet/IP.

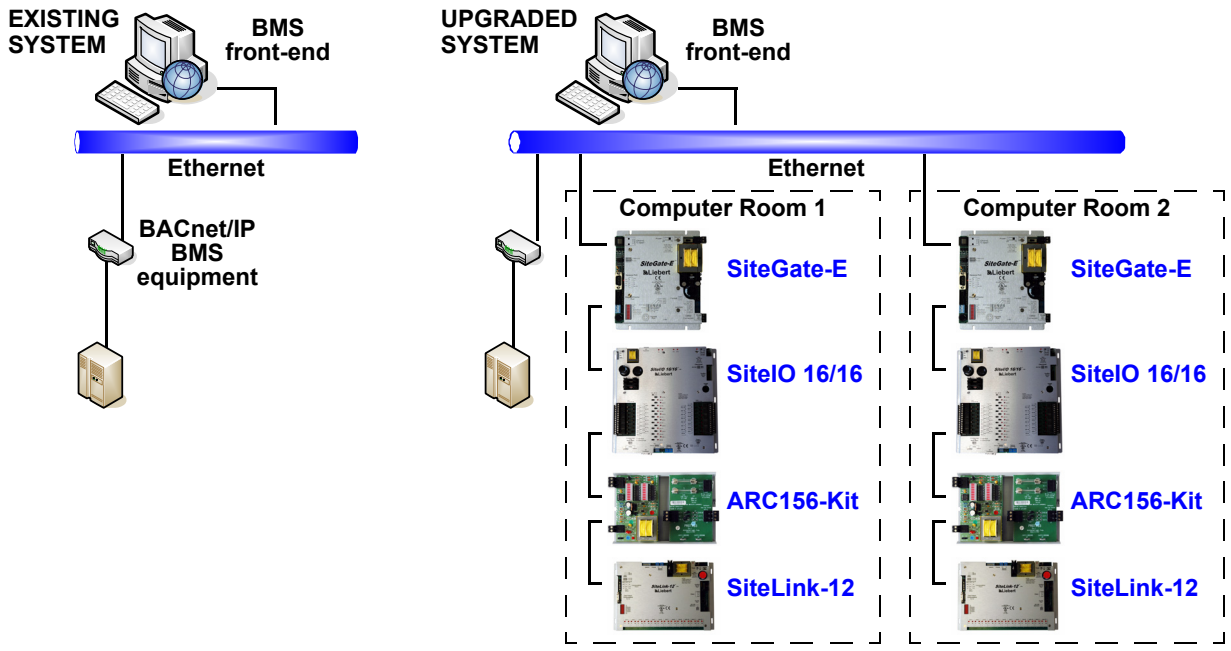
5.2.3 Bill of Materials

Table 13 Bill of materials: BACnet/IP to BMS (without SSWeb front-end)

Qty.	Mktg. P/N	Description
2	SITEGATE-E	32-bit Ethernet-ready gateway module
8	XFMR24	Transformers for 120/24VAC module power supply
2	SITELINK-12	SiteScan interface module to 12 Liebert units
2	ARC156-KIT	PROT485, DIAG485 and terminating resistors with enclosure
2	SITEIO1616	Site I/O module, 16 universal inputs and 16 digital outputs

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 11 BACnet/IP to BMS without SiteScan Web front-end



5.3 BMS Front-End Interfacing to Liebert Equipment by EIA-485 Modbus

Modbus is an industry standard means of communicating between systems from different vendors. A SiteScan Web system using Modbus allows a Third Party to request information from a SiteLink, With SiteScan Web, single or multiple SiteLinks can communicate to other systems using Modbus on either Port A or Port B.

Both ports send out Modbus information. They differ in that Port A is configurable for RS-232 or two- or four-wire RS-485 media access. Port B is DB-9 and RS-232 only.

5.3.1 Port A—RS-485 Modbus

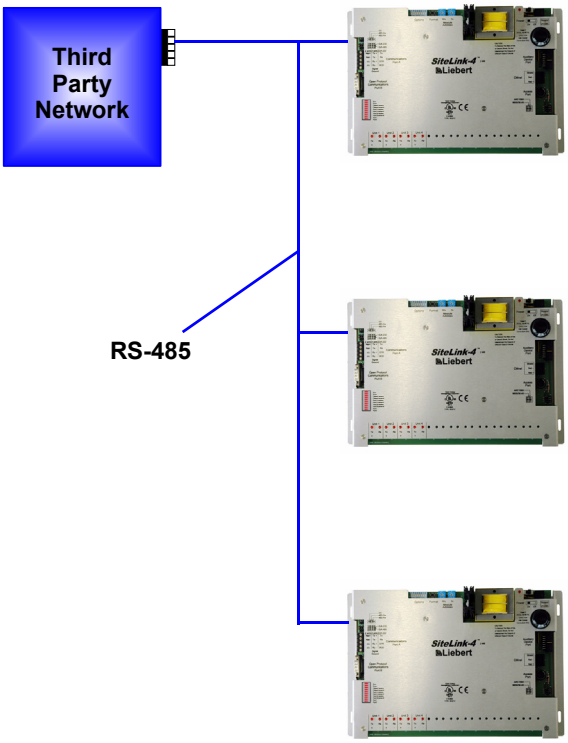
When configured for RS-485, this allows Port A to be daisy-chained with multiple SiteLinks. In this example, both the SiteLinks and the third-party device use a five-screw terminal to make the wiring connection. When using RS-485 each SiteLink or the third-party equipment is between 1250 and 4,000 ft. (381-1219m) away depending on the baud rate being used. Make this connection with shielded or unshielded twisted pair wiring.

Table 14 Bill of materials: Port A—RS-485 Modbus

Qty.	Mktg. P/N	Description
3	SITELINK-4-M	SiteLink-4-M (4 Liebert IGM interfaces)
3	XFMR24	Transformers for 120/24VAC module power supply

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 12 Modbus on Port A—RS-485



5.3.2 Port A—RS-232 to RS-485 Modbus

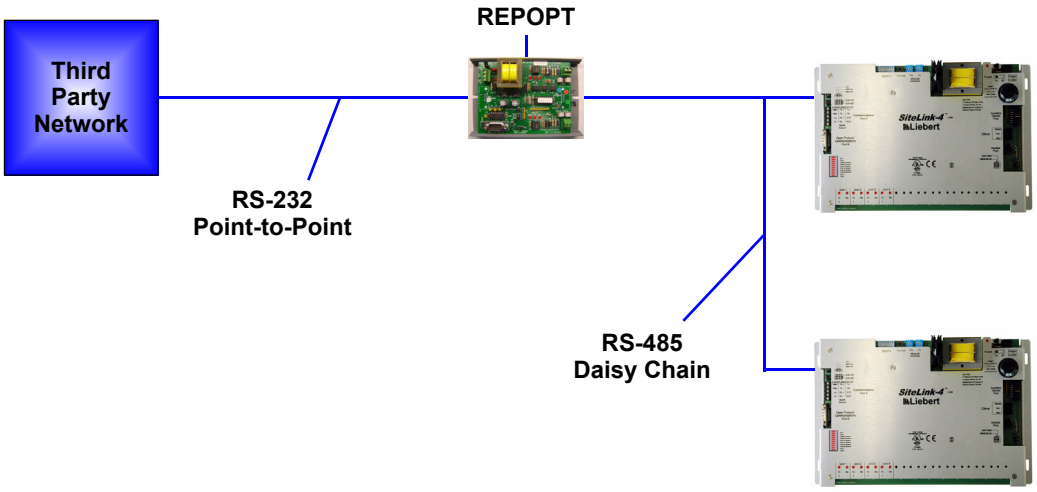
If the third-party device communicates using RS-232 point-to-point, but the configuration requires multiple SiteLinks, use a REPOPT to convert RS-232 to RS-485. The RS-232 can be either DB-9 or two-wire screw terminal connection types.

Table 15 Bill of materials: Port A—RS-232 to RS-485 Modbus

Qty.	Mktg. P/N	Description
2	SITELINK-4-M	SiteLink-4-M (4 Liebert IGM interfaces)
1	REPOPT	EIA-485 signal to EIA-232 signal converter
2	XFMR24	Transformers for 120/24VAC module power supply

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 13 Modbus on Port A—RS-232 to RS-485



5.3.3 Port B—RS-232 Modbus

Use Port B for communications between one SiteLink and the other vendor, where the vendor's equipment is up to 50 ft. (15m) away. This is a DB-9 connection using the RS-232 protocol. If the vendor's equipment also uses a DB-9 connection, the connection is three wire, ASYNC, continuous connection.

Table 16 Bill of materials: Port B—RS-232 Modbus

Qty.	Mktg. P/N	Description
1	SITELINK-4-M	SiteLink-4-M (4 Liebert IGM interfaces)
1	XFMR24	Transformers for 120/24VAC module power supply

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 14 Modbus on Port B—RS-232

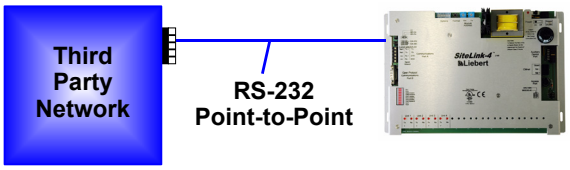
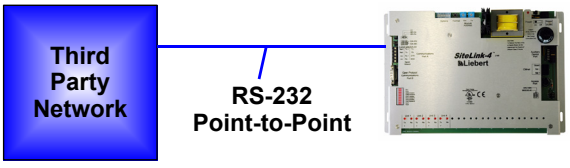


Figure 15 Modbus on Port A—RS-232



5.3.4 Combining SSWEB and Modbus

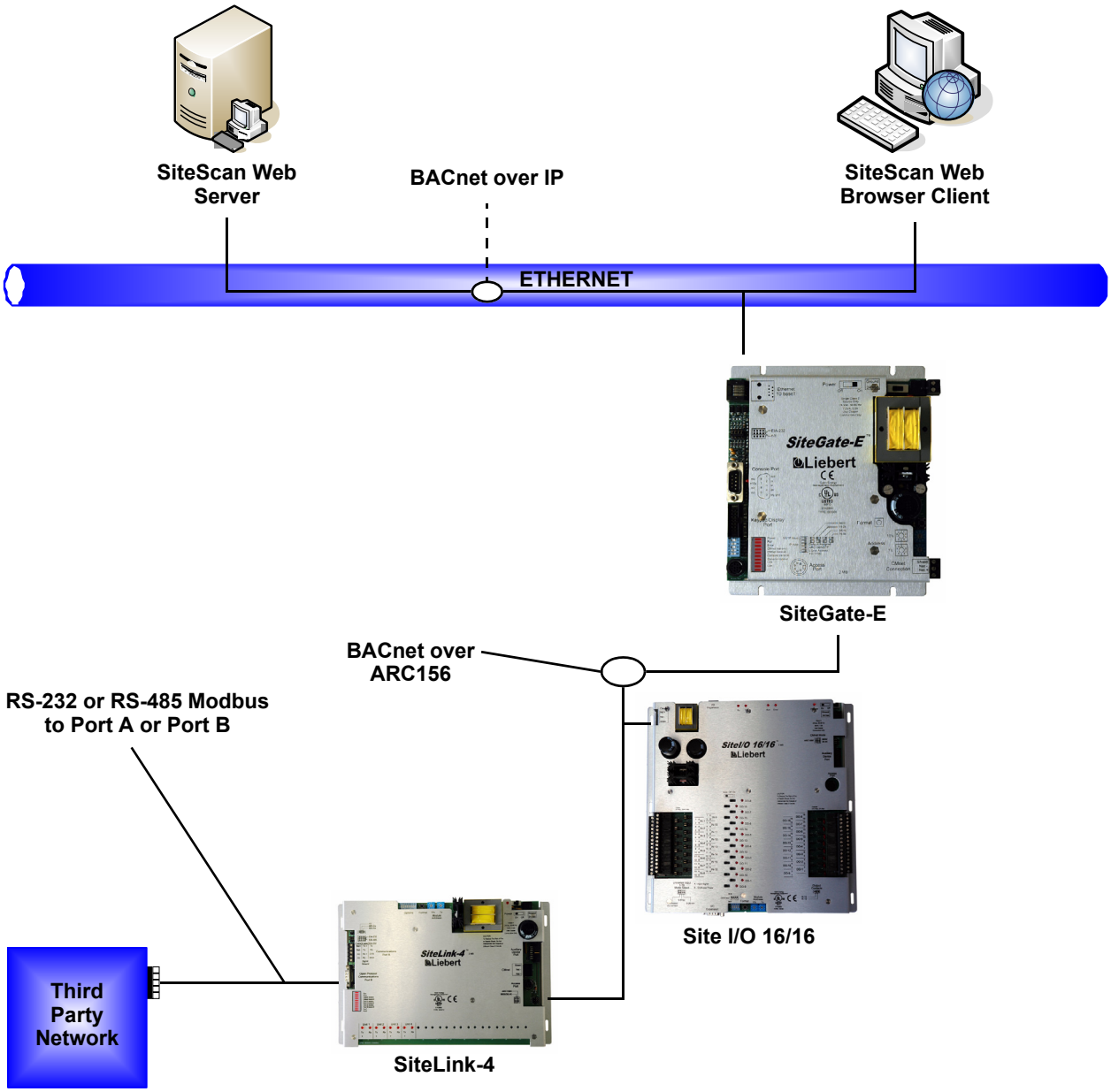
It is possible to have a Modbus system communicating to a SiteScan Web system with a server, gateway and SiteLink.

Table 17 Bill of materials: Combining SSWEB and Modbus

Qty.	Mktg. P/N	Description
1	SITEGATE-E	SiteGate-ETH Router
1	SITELINK-4-M	SiteLink-4-M (4 Liebert IGM interfaces)
1	SITEIO10	Site I/O 10 (Universal Input Module)
2	XFMR24	Transformers for 120/24VAC module power supply

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 16 Example of combination SSWEB and Modbus



5.4 SiteTPI-E with OpenComms NIC (or OpenComms 485)

Customer has installed OpenComms NIC cards in Liebert environmental and power precision equipment and wants to monitor the equipment with SiteScan Web. The following configuration also applies to Liebert units with OpenComms 485 cards.

5.4.1 Target Application

A typical application might be:

- Facility manager and IT manager both need to monitor equipment
- Graphical or non-graphical software
- Liebert units with OpenComms NICs installed

5.4.2 Description

For this configuration, the customer has equipment that is managed and monitored by the facility engineer and the IT manager. It is important for the facility manager to monitor all the equipment in their location. The equipment in the data center needs to be monitored by the IT manager.

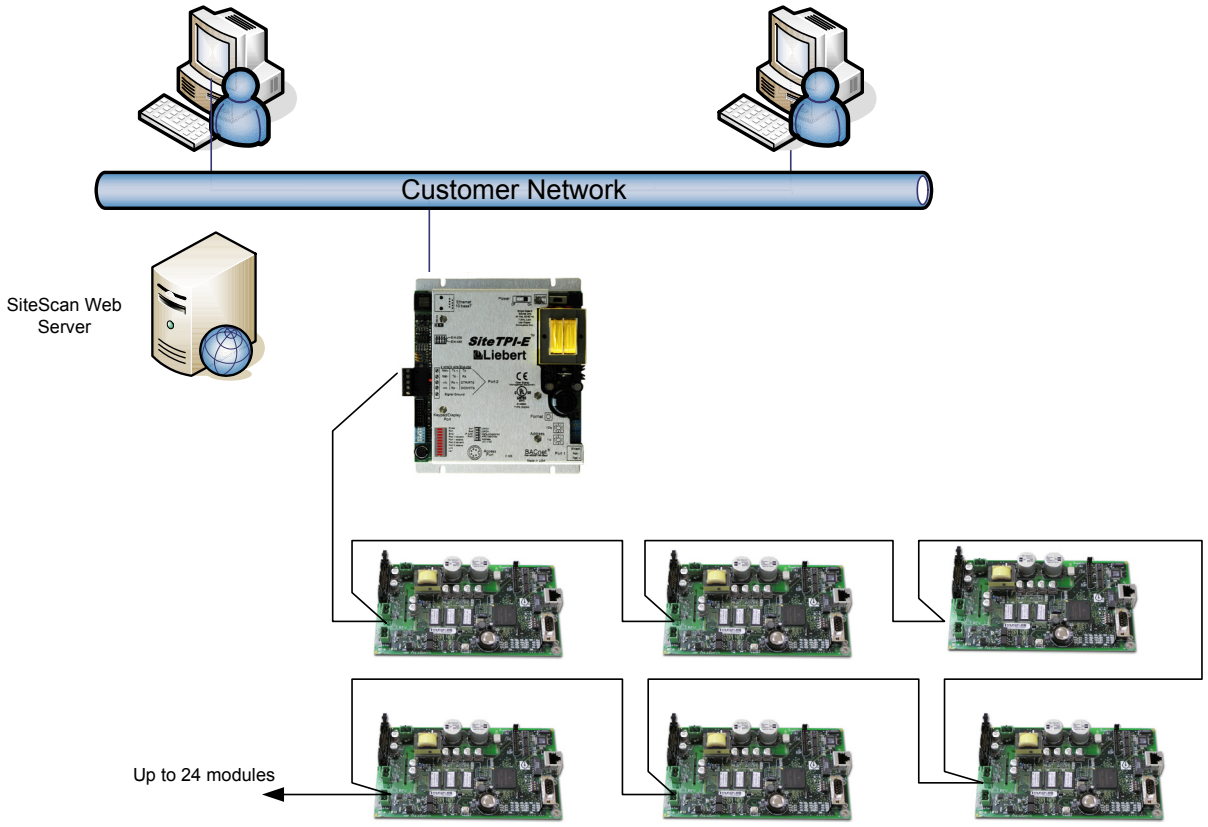
Note: Since the SiteTPI is connecting to Liebert equipment, TPICONFIGs are not required.

5.4.3 Bill of Materials

Table 18 Bill of materials: SiteTPI-E with OpenComms NIC

Qty.	Mktg. P/N	Description
1	SSWEB	SiteScan Web upgrade of SS2000W or SS2W
1	SITEGATE-E	32-Bit Ethernet-ready Gateway module
1	SiteTPI-E	TPI to integrate Modbus device into SiteScan Web
2	XFMR24	External power supply - 120VAC/24VAC
2	HIGRAPHIC	Graphic floor plan

Figure 17 Example of SiteTPI-E with OpenComms NIC*



*** NOTE: The same configuration may be used for Liebert units with OpenComms 485 cards.**

5.5 Basic SiteTPI-E with Third-Party Equipment

Customer wants to monitor third-party equipment with SiteScan Web.

5.5.1 Target Application

A typical application might be:

- Basic SiteTPI with third-party equipment
- Existing system is SiteScan Web

5.5.2 Description

Connecting the third-party equipment to the SiteScan Web system requires a SiteTPI-E and at least one TPICONFIG to cover the cost of custom programming of the function block that will be used to interface with the third-party equipment.

Note: A HIGRAPHIC-M is required for the new device to show up on a graphic.

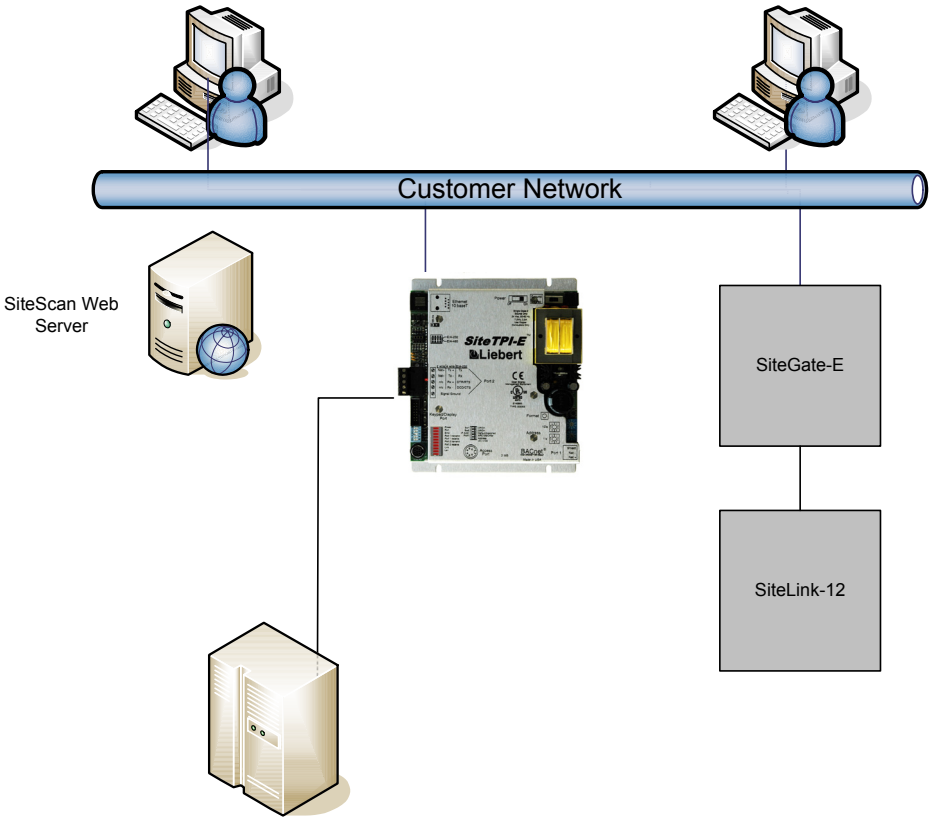
5.5.3 Bill of Materials

Table 19 Bill of materials: Basic SiteTPI-E with third-party equipment

Qty.	Mktg. P/N	Description
1	SiteTPI-E	TPI to integrate Modbus device into SiteScan Web
1	TPICONFIG	Includes custom programming of up to 100 mapped Modbus data points
1	XFMR24	External power supply - 120VAC/24VAC
1	HIGRAPHIC-M	Modification to an existing floor plan or graphic

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 18 Example of basic SiteTPI-E with third-party equipment



5.6 SiteTPI-E and Third-Party Equipment with Different Modbus Protocol

Customer wants to monitor third-party equipment with SiteScan Web. The third-party equipment supports Modbus, but each type supports a different Modbus interface. The Modbus protocol on the UPS supports 2-wire interface; the air equipment supports 4-wire Modbus interface.

5.6.1 Target Application

A typical application might be:

- Third-party equipment with different Modbus interfaces
- Existing system is SiteScan Web
- 5 third-party UPSs that support 2-wire Modbus interface
- 10 third-party air units that support 4-wire Modbus interface

5.6.2 Description

It is important to determine what type of Modbus interface the third-party equipment supports. For this configuration, one SiteTPI-E will be used for the 2-wire Modbus devices and a separate SiteTPI-E will be used for the 4-wire Modbus equipment. The order requires five TPICONFIGs, two for the UPS equipment and three for the third-party environmental equipment.

Note: This order requires HIGRAPHIC-M to add the third-party equipment to the existing SiteScan Web graphics.

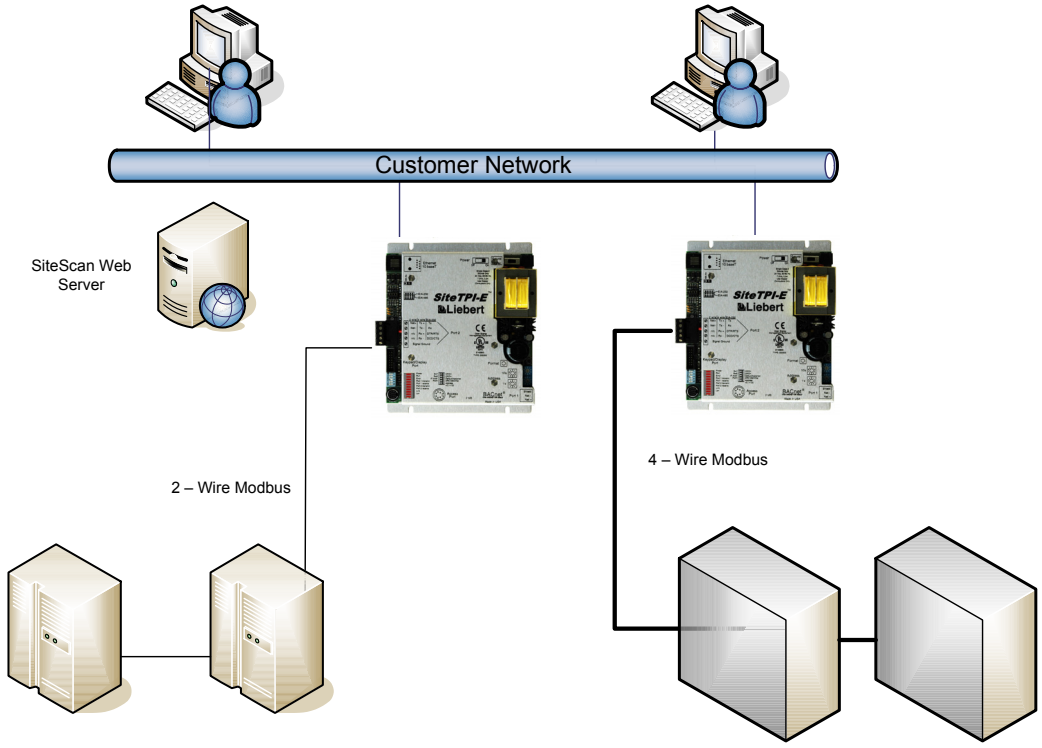
5.6.3 Bill of Materials

Table 20 Bill of materials: SiteTPI-E and third-party equipment with different Modbus protocol

Qty.	Mktg. P/N	Description
2	SiteTPI-E	TPI to integrate Modbus device into SiteScan Web
5	TPICONFIG	Includes custom programming of up to 100 mapped Modbus data points
2	XFMR24	External power supply - 120VAC/24VAC
2	HIGRAPHIC-M	Modification to an existing floor plan or graphic

Note: The bill of materials does not include LGS startup part numbers. Most LGS startup part numbers are added automatically when ordering.

Figure 19 Example of SiteTPI-E and third-party equipment with different Modbus protocol



6.0 ARCNET156

6.1 ARCnet156 CMnet Components

The SSWEB-Liebert gateways and control modules communicate using ARCnet156, a token-passing protocol running at 156 Kbps. ARCnet156 requires network boards to properly terminate, bias, protect and repeat data transmitted over the twisted pair EIA-485 segment.

An ARC156-Kit should be used for every gateway module. The kit filters out some signal noise and provides diagnostic information about the ARCnet156 network. Two 120 ohm terminators are included with each ARC156-Kit.

6.2 Segment Requirements

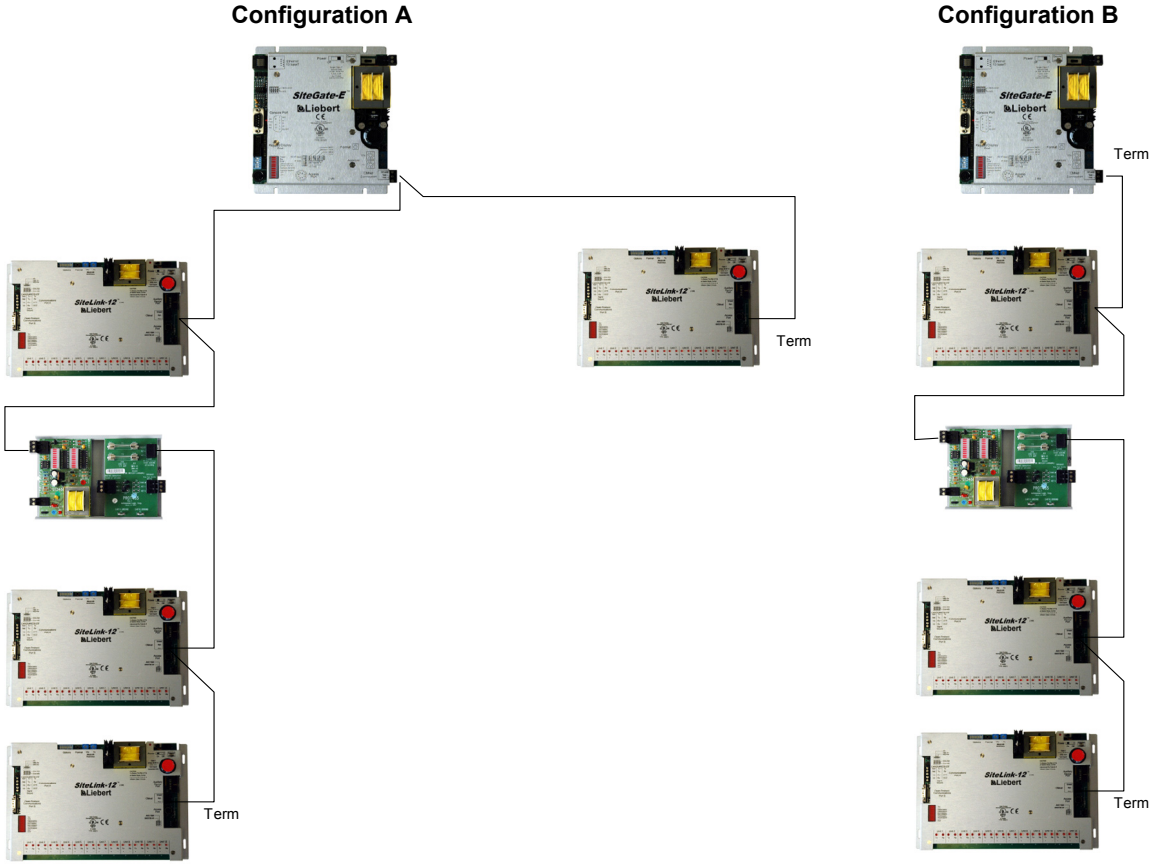
An ARCnet156 segment is an arrangement of gateways, control modules and ARCnet156 devices up to 2,000 ft. (610m) long.

A segment must:

- Be wired in a daisy chain (see **Figure 20**).
- Have an ARC156-KIT installed in the middle of the segment.
- Have a PROT485 installed at each building entrance and exit.
- Have one ARC156-KIT for every 32 modules and each 2,000 ft. (610m) of equipment and cabling.
- Not exceed 50 modules including ARCnet enhancement devices.
- Have a 120 ohm terminator at each end unless the segment is less than 10 ft. (3m) long.

NOTE
Each segment must use a Magnum ARC cable.

Figure 20 Acceptable daisy chain configurations



6.3 Terminations

At 156 Kbps, a signal reaching the end of an unterminated cable can echo, or reflect back, creating a distortion in the signal and degrading the quality of the communications. To prevent this, every segment on the ARC 156 network must have a 120 ohm terminator placed at each end of the segment.

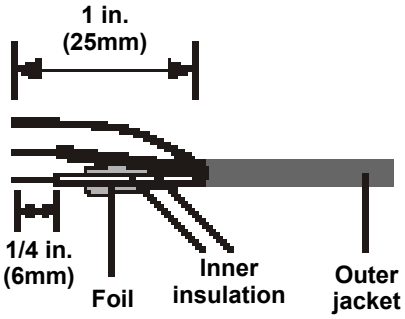
To insert the 120 ohm terminator, make sure the module's power is turned off and attach the terminator to the CMnet positive and negative terminals. The 120 ohm terminating resistors are included with the ARC156-KIT.

6.4 Wiring Recommendations

If bare communication wire comes in contact with the cable's foil shield, drain/shield wire or a metal surface other than the connector, the module might not communicate. When connecting the wire, follow these guidelines:

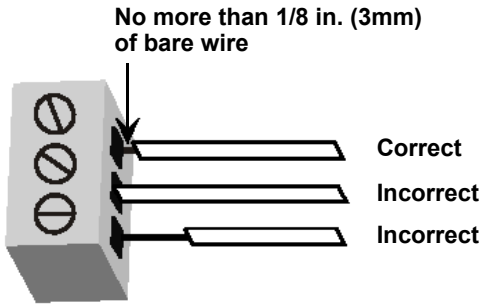
- When stripping the outer jacket, take care not to nick the inner insulation. The wire's outer jacket is brittle enough to work free after being nicked or partially cut. Do not strip more than 1 in. (25mm) of the outer jacket. See **Figure 21**.

Figure 21 Stripping an ARC156 wire



- Strip about 1/4 in. (6 mm) of the inner insulation. Do not allow more than 1/8 in. (3 mm) bare communication wire to protrude from the connector. See **Figure 22**.

Figure 22 Screw terminal block connection



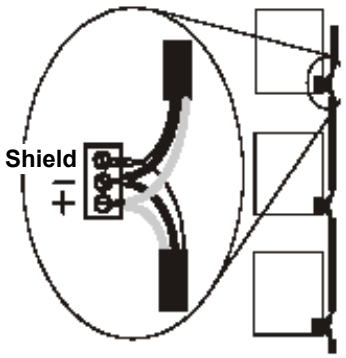
- Twist the drain or shield wires from both cables together before inserting them in the connector.

6.5 Cable Shields

Connect the shields as shown in **Figure 23**. The shields should be connected at each module's shield connection terminal.

Do not ground the shield to earth ground or to the module's power ground. The PROT485 and the individual modules allow the shield to float a limited amount so that there are no ground loops. But if the voltage on the shield becomes too great relative to the earth ground, then the excess voltage is bled off with protective devices on the PROT485 or on the modules.

Figure 23 Using shielded cable



6.6 Noise

Do not run AC power wires or the module's relay output wires next to the communication wires or sensor input wires.

Table 21 lists common sources of noise that can affect signal quality. Try to avoid these sources of noise when running communication or sensor wiring. If noise is a problem and it is not possible to move the wiring, use ferrite clamp-on chokes on the cabling to help improve signal quality.

Table 21 Sources of noise

Spark ignitors	Induction heaters
Radio transmitters	Relays
Variable speed drives	Fluorescent lights
Electric motors (> 1hp)	Lamp dimmers
Generators	Video display devices
Large contactors (i.e., motor starters)	Parallel runs with power lines
Transformers	Other electronic modules

6.7 Upgrading to ARC156

Before upgrading a legacy CMnet to ARC156, you must:

- Ensure adequate wiring. See **6.4 - Wiring Recommendations** for details.
- Verify the network configuration is acceptable. See **6.2 - Segment Requirements**.
- Use the appropriate network accessories—for example, 120 Ohm terminators and REP485 repeaters.
- Make sure all modules are capable of using Exec 6.0 or later. Refer to the Technical Instructions for each module or to the Technical Handbook to determine this.

Follow these steps to upgrade the CMnet to ARC156:

1. While the CMnet is running at 38.4 Kbps or 9600 bps, transfer an Exec 6.0 (or higher) driver into every module.

   This can be done over a Direct Connection through a gateway module, or by setting the module for 38.4 Kbps or 9600 bps and Direct Network connecting to the module's Access Port using an APT in 485 mode.
2. Add a 120 Ohm terminator to each end of the network segment.
3. Add at least one ARC156-KIT to the middle of the network segment. Set the bias jumper to add bias.

   You can have more than one ARC156-KIT per network segment, but no more than one ARC156-KIT should have the bias jumper set to add bias.
4. Go to each module and set the CMnet baud rate jumper for 156 Kbps communication.

   Once you change the module's baud rate, the module can no longer communicate on the CMnet. When all modules are set to use 156 Kbps communications, a network reconfiguration is required to start the ARC156 CMnet.
5. To reconfigure the CMnet immediately, remove and then restore power to one of the modules. Otherwise, wait up to 30 minutes for the modules to reconfigure themselves.

NOTE
A CMnet divided into segments may experience several reconfigurations until all the segments are synchronized.

6. Add other devices (like a REP485 or PROT485) to the CMnet as necessary to improve the signal quality.

7.0 WIRING GUIDELINES

Table 22 Standard SiteScan Web wiring

Application	Max. Cable Length	Cable Recommendation
ARC156 CMnet	2000 ft. (610m)	Magnum A3-ARC-156 Magnum A3-ARC-156-2
RS-422 - IGMnet		
UTP Non Plenum	1000 ft. (305m)	Belden 8442 (22 AWG)
STP Non Plenum		Belden 9461 (22 AWG)
UTP Plenum		Belden 88442 (22 AWG)
STP Plenum		Belden 88761 (22 AWG)

Table 23 Third-party wiring

Application	Max. Cable Length		Cable Recommendation
RS-232 - Modbus	50 ft. (15m)		See SiteLink manual for pinouts
RS-485 - Modbus	**38.4K baud**	**9600 baud**	
UTP Non Plenum	2500 ft. (762m)	4000 ft. (1219m)	Belden 8442 (22 AWG)
STP Non Plenum	1250 ft. (381m)	3000 ft. (914m)	Belden 9461 (22 AWG)
UTP Plenum	2500 ft. (762m)	4000 ft. (1219m)	Belden 88442 (22 AWG)
STP Plenum	1250 ft. (381m)	3000 ft. (914m)	Belden 88761 (22 AWG)

Table 24 Input/output wiring

Application	Max. Cable Length	Cable Recommendation
Contact Closure		
UTP Non Plenum	300 ft. (91m)	Belden 8442 (22 AWG)
STP Non Plenum		Belden 9461 (22 AWG)
UTP Plenum		Belden 88442 (22 AWG)
STP Plenum		Belden 88761 (22 AWG)
Two-Wire Transducers and Thermistors	300 ft. (91m)	18-22 AWG Stranded (e.g., Belden 8442)
Four-Wire Transducers	300 ft. (91m)	18-22 AWG Stranded (e.g., Belden 8444)
RPMP Voltage Cable	60 ft. (18m)	18 AWG Stranded 600V Insulation
RPMP Current Transformer Cable	60 ft. (18m)	10-12 AWG Stranded 600V Insulation

NOTES

APPENDIX A - TERMINOLOGY

ARCnet

The protocol used for communications between the Liebert gateway and the Liebert control modules. This is a token-passing protocol where each module transmits information to the gateway in turn based on its physical address.

BACnet

Data communication protocol for Building Automation and Control Networks (BACnet). It uses IDs to identify all points that are part of the configuration, such as the SSWEB server, BACnet and ARCnet networks, gateways and control modules. Referred to as Object IDs, these IDs make sharing information between devices a relatively simple task using BACnet. Developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), BACnet is now an American national standard, a European pre-standard, and a potential global standard. ASHRAE Standing Standard Project Committee supports and maintains the protocol.

For details, go to:

www.bacnet.org

CMnet

The network connecting the Liebert gateway and the Liebert control modules. Daisy chain up to 50 control modules per Control Module net, or CMnet.

The CMnet can consist of any combination of the following: SiteLink-12-ARC, SiteLink-4-ARC, SiteI/O 10/0-ARC, SiteI/O 16/16-ARC, SiteI/O 32/0-ARC, SiteI/O X8/0 and SiteTPI-M-ARC, Third Party Interface (TPI) modules.

Control Module

A device connected to the CMnet. This includes Ethernet gateways, SiteLink modules and Site I/O modules and TPI modules.

Ethernet Backbone

Wiring and communications equipment permitting multiple computers to share information and resources using the Ethernet media access type.

LAN / WAN

Any Local Area Network or Wide Area Network using the Ethernet media access type.

Gateway

A device that performs protocol conversion between different types of networks or applications. The Liebert gateway receives BACnet over ARCnet protocol from the Liebert control modules and converts it to BACnet over IP for protocol communication to the SSWEB server. The Liebert SiteLink modules receive IGM protocol from the Liebert environmental and power equipment and convert it to BACnet over ARCnet protocol for communications to the Liebert gateway.

HTTP

Rules for exchanging files (text, graphic images, sound, video, and other multimedia files) between browsers. Your Web browser is a hypertext transfer protocol client, sending requests to the SiteScan Web Sever. When the browser user enters file requests by either opening a Web file or clicking on a hyperlink, the browser builds an HTTP request and sends it to the Web server. The Web server receives the request and returns it after necessary processing.

IGMnet

Information Gathering Module Network is the protocol that SiteLinks use to communicate to the Liebert units over the EIA422 connection type. It is a point-to-point protocol, where one device connects directly to another and only those two devices communicate with each other.

Liebert Gateway

Also referred to as a router, the Liebert gateway routes information between the Web server and the Liebert control modules. It uses an Ethernet network and the TCP/IP and BACnet protocols, also referred to as BACnet over IP.

Half Router

A function of a Liebert gateway. If no Ethernet connection is available to the customer's network, a Liebert gateway can communicate using a modem to a second Liebert gateway and serve the function of one Liebert gateway connected to the backbone.

Media

The physical substance that carries data. SiteScan Web media are Category 5 Ethernet cables and various types of Shielded Twisted Pair (STP) and Unshielded Twisted Pair (UTP) cables.

Media Access Types

Protocols used to access media. SiteScan Web media access protocols are Ethernet, RS-485, RS-422 and ARCnet156. Ethernet uses a Carrier Sense Multiple Access Collision Detection (CSMA/CD) schemes where multiple devices sense signals on the media simultaneously, access the media when they hear no signals and detect collisions that cause retransmission of information. RS-485 and RS-422 are point-to-point protocols. Point-to-point protocols transmit information directly from one device to another. ARCnet156 is a token-passing protocol. Token-passing protocols give each device a designated period to transmit information after it receives permission (a token) based on its physical address.

Modbus

A building management standard protocol for interfacing devices from different vendors. It provides client/server communication between devices connected on different types of buses or networks. It is a request-reply protocol and offers services specified by function codes. Modbus function codes are elements of Modbus request/reply PDUs.

For more information, go to:

www.modbus.org

Network Management System

Software system to track and configure equipment on a network. It displays information about devices on the network that have IP addresses and also sends and receives information to SNMP protocol devices.

Point

Graphics in the SiteScan Web system. For example, a point is one value displayed from the Liebert unit, such as temperature. The IGM reference library lists possible points for each Liebert unit. Point also refers to any value obtained via a contact into the SiteScan system; for example, "Temperature" from a thermistor is a point.

Protocols

Conventions governing the treatment and the formatting of data in an electronic communications system. SiteScan Web protocols are Transmission Control Protocol/Internet Protocol (TCP/IP), Building Automation and Control networks (BACnet), Attached Resource Control Network (ARCnet), and Information Gathering Module Network (IGMnet). TCP/IP establishes a connection between two devices and controls the transmission of information using the IP address of each device. BACnet broadcasts requests for information to devices based on a network or device number (network ID or object ID) and the devices respond back. ARCnet transmits a token to devices based on their physical address. IGM sends requests to Liebert equipment based on a set of codes for unit, status, alarm and control information.

Router

A device that forwards data packets from one local area network (LAN) or wide area network (WAN) to another. Based on routing tables and routing protocols, routers read the network address in each transmitted frame and send it based on the most expedient route. In SSWEB, the Liebert gateways route BACnet over IP traffic from one segment to another.

SNMP

Simple Network Management Protocol; a protocol to manage devices. SNMP sends traps that signify alarm conditions within a device. It uses other commands to allow control and to monitor a device.

STP

Shielded Twisted Pair cable is protected with an aluminum or copper sheet or stranding to reduce electromagnetic interference. Twisted strands in the cable cancel out the effects of electromagnetic frequency caused by current flowing through each wire in the cable.

STP Plenum Cable

is Shielded Twisted Pair with insulation that will not produce poisonous fumes if it burns, as national codes require for cable installed in an air duct. STP Plenum cable also is protected with an aluminum or copper sheet or stranding to reduce electromagnetic interference. Twisted strands in the cable cancel out the effects of electromagnetic frequency caused by current flowing through each wire in the cable.

URL

Uniform Resource Locator, the global address of documents and other resources on the World Wide Web. The first part of the address indicates what protocol to use, and the second part specifies the IP address or the domain name where the resource is located. For example, the following URL specifies a Web page that is be fetched using the HTTP protocol:
http://www.pcwebopedia.com/index.html

UTP

Unshielded Twisted Pair cabling is not shielded against electromagnetic interference. Twisted strands in the cable cancel out the effects of electromagnetic frequency caused by current flowing through each wire in the cable.

UTP Plenum Cabling

Unshielded Twisted Pair Plenum cabling has insulation that will not produce poisonous fumes if it burns, as national codes require for cable installed in an air duct. The cabling is not shielded against electromagnetic interference. Twisted strands in the cable cancel out the effects of electromagnetic frequency caused by current flowing through each wire in the cable.

NOTES

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- Integrated systems that provide both environmental and power protection in a single, flexible package
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While every precaution has been taken to ensure the accuracy and completeness of this literature, Liebert Corporation assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

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